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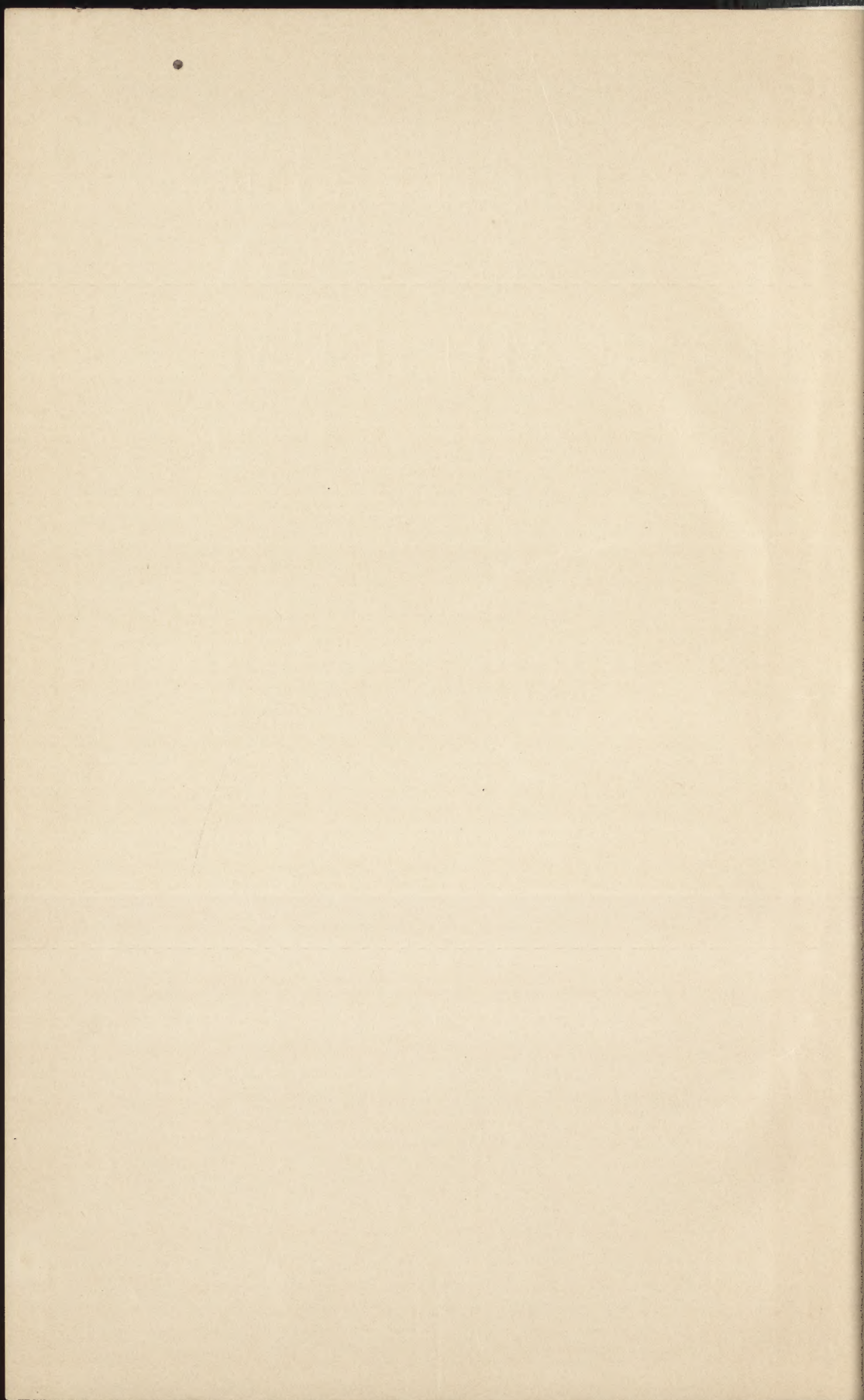
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VOLUME I

NEW YORK

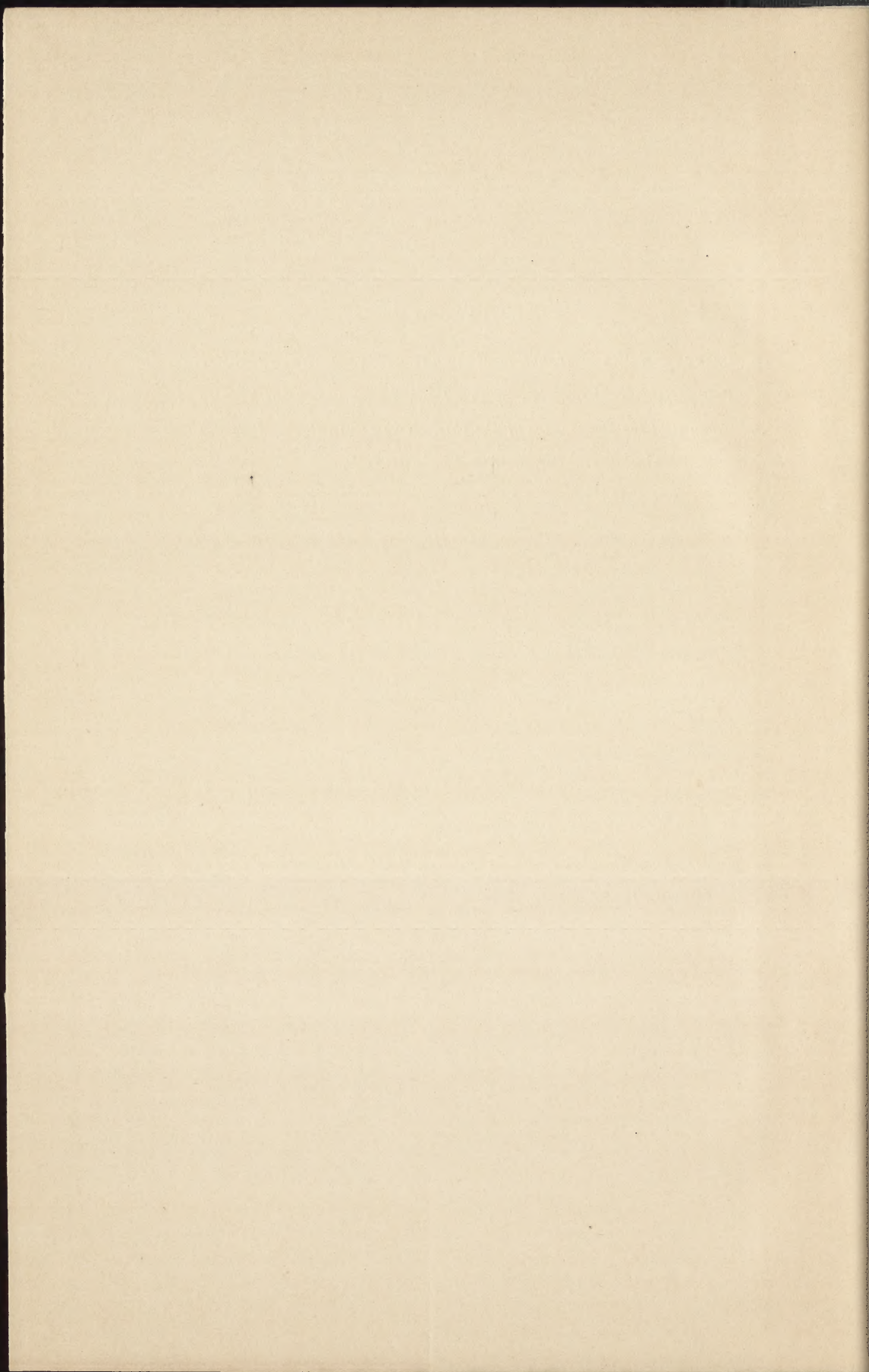
PUBLISHED BY THE HEYER MUSEUM

1913-1915



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LUCAYAN ARTIFACTS FROM THE BAHAMAS

By THEODOOR DE BOOY

SEVERAL noteworthy artifacts were found on the Bahama islands during the year 1912 by the expedition sent out by George G. Heye, Esq., of New York City, in the interest of the Heye Museum. This expedition was in the Bahamas from June until December, 1912, investigations being carried on chiefly from a sailing vessel, through which medium the various islands were visited. It is not the purpose of this brief article to describe the manner in which the work was conducted, but it may be well to state that it is practically impossible in the Bahamas to cover the many islands and cays unless one either owns or charters a sailing craft of some description, as the voyages of the mail schooners from Nassau are uncertain and at intervals of from two weeks to two months, and even then one cannot visit the uninhabited cays.

To date, practically the only wooden objects found in the Bahamas and in the Greater Antilles are idols and the well-known and characteristic stools (*duhos* or *sillas*), no wooden objects of a strictly utilitarian character being in any collection from these regions, if one excepts two bowls or platters now in the library at Grand Turk (Turks and Caicos islands). The writer is not inclined to classify *duhos* other than as ceremonial objects, despite the many contentions to the contrary. From the accounts of Las Casas and Herrera, these objects were held in high esteem by the Ciboneys and other pre-Columbian tribes, and it is hardly to be believed that the

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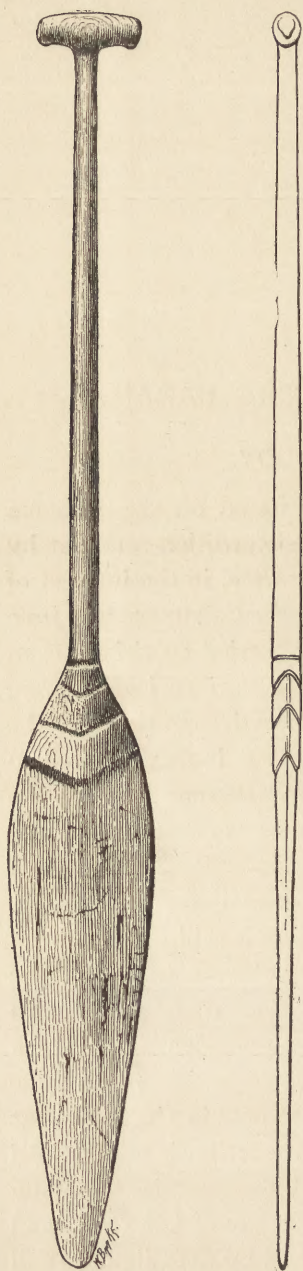


FIG. 1.—Wooden paddle from Mores island.

aborigines would have given so much care to the fashioning of a piece of wood when a burnt-out log would have served the purpose of a seat equally well. The few duhos in existence are made of *madeira*, a species of wood related to mahogany, hard to work and undoubtedly valuable to the Ciboneys, considering the few large *madeira* trees that are found in the Bahamas. In fact, it is more than likely that the duhos were imported from the larger islands (Haiti and Porto Rico), as it would be difficult to find a tree of sufficient size in the Bahamas to permit the manufacture of one of these stools. A few wooden cassava-graters and a planting dibble have been found in Haiti and Santo Domingo, and while all these objects and the many references made to them by the early chroniclers assure us that the pre-Columbian inhabitants were expert woodworkers, it is to be regretted that so little material of this kind has survived. Taking the climatic conditions into consideration, however, it is not surprising that so few artifacts of wood have survived the ravages of time, and it would appear safe to state that such objects as have survived are invariably fashioned from *madeira*, cedar, and *lignum-vitæ*.

In view of the fact that so few wooden objects are known from these regions, or even from the Greater Antilles, a canoe-paddle, found on Mores island, deserves first mention. While working in the Bahamas, the author visited Mores island,

one of the cays on the Little Bahama bank. This cay is inhabited by about twenty negro families, who are engaged in the sponge industry. The Mores islanders have the reputation of being the worst negroes in the Bahamas, and their destitution is most abject. Mores island is literally honeycombed with caves, some of which are being regularly worked for guano, which is sold to the neighboring islanders for fertilizer. The author visited several of these caves, some of which had not hitherto been entered. In one of them it was his good fortune to find the canoe-paddle referred to, a specimen of special anthropological value as it is the only one of its kind known to the author.

The paddle (fig. 1) is fashioned out of a single piece of cedar, and may be described as consisting of a crosspiece, a shaft, and a blade. The paddle is in good condition, and the workmanship as a whole is excellent. It was found on a shelf in the cave and was covered only by a slight deposit of guano dust. The fact that the paddle is of cedar accounts for it not having been attacked by wood-boring insects, and as the cave in which it was found is a dry one, it was not subjected to decay. The crosspiece is $4\frac{1}{2}$ inches (11.5 cm.) long and $1\frac{3}{8}$ inch (3.5 cm.) thick. There is a small knob on the underside of the crosspiece, near each end, evidently designed to afford a better hold. The shaft is 2 feet (61 cm.) long and thickens toward the blade-end, the diameter being $\frac{15}{16}$ inch (2.4 cm.) at the top and $1\frac{1}{2}$ inch (3.8 cm.) at the point where the shaft broadens into the blade. The blade has a length of 2 feet $\frac{3}{4}$ inch (62.8 cm.), is $6\frac{1}{4}$ inches (16 cm.) broad at the widest point, whence it tapers gradually to a width of $1\frac{1}{4}$ inch (3.2 cm.) at the extremity. The end of the blade is rounded, but whether or not the paddle originally had a sharp point cannot be determined. The blade is $\frac{5}{8}$ inch (1.5 cm.) thick at the widest point, and $\frac{1}{2}$ inch (1.2 cm.) at the tip. The shaft merges gradually into the blade, and four simple, angular lines are shown on each side as ornamentation, which also serve to let the thickness of the shaft taper down by even steps to the thickness of the blade. The total length of the paddle is 4 feet $2\frac{3}{4}$ inches (129 cm.).

In Mallery's monograph on Picture-writing of the American

Indians¹ there is an illustration of some petroglyphs found in a cave on Rum cay in the Bahamas and figured by Lady Blake. In this group of petroglyphs (fig. 2) is one that appears to be an



FIG. 2.—Petroglyphs on Rum cay. (After Mallery.)

exact representation of the type of paddle found on Mores island. Mr L. G. K. Brace, a botanist of Nassau, has visited the Rum Cay cave and mentioned the picture of the paddle to the writer, who had no opportunity to visit the island in order to inspect it. The



FIG. 3.—Indian paddling a canoe. (After Oviedo.)

size of these petroglyphs is not given in the memoir referred to. An old illustration from Oviedo also figures one of the aboriginal canoes and paddles (fig. 3), and he mentions that the canoes were

¹ *Tenth Annual Report of the Bureau of Ethnology*, p. 139.

propelled by wooden oars (*nahos*) that were provided with a cross-piece at one end and a blade at the other.

Another wooden artifact was added to the Heye Museum by the gift of a duho, or wooden stool, found in a small, open cave at Spring point on Acklins island, covered by the débris of a large slab of limestone that had fallen from the roof of the cave. A negro hunter had taken shelter in this cave during a rainstorm, and observing one of the legs of the duho protruding from the débris, recovered it and carried it to the nearest white man, a Mr Darrell, who in turn presented it to Dr F. A. Holmes, a physician of Nassau.



FIG. 4.—Wooden duho from Acklins island.

Dr Holmes gave it to the author, who, accompanied by Mr C. V. Spicer, a member of the expedition, visited the cave in which the specimen had been found, but they were not successful in finding any more material.

The duho (fig. 4) stands $5\frac{1}{4}$ inches (13.3 cm.) high, is 9 inches (22.8 cm.) wide at one end and 8 inches (20.3 cm.) at the other. Both ends are broken off near the legs, and judging from the stools of like type in other collections, the broad end may have sloped upward as a back, while the narrower end probably terminated in the representation of the head of a turtle or a human being. The aggregate length of the seat is $9\frac{1}{4}$ inches (23.4 cm.); the legs

are 5 inches (12.6 cm.) high. Two of the legs are in good condition, but the other two are partly destroyed. The bottom of the seat is smooth and shows excellent workmanship; the top is very rough and has evidently been exposed to the weather and to the ravages of ants and other insects. The diameter of the two perfect legs is 2 inches (5.1 cm.).

A third object of interest is a fractured ceremonial celt (fig. 5) from Mariguana island. Although in fragmentary condition, this



FIG. 5.—Ceremonial celt from Mariguana island.

object shows clearly what the original outlines must have been, and it may be included among the best examples of prehistoric stonework from the Bahamas. The celt is $2\frac{1}{2}$ inches (6.4 cm.) at the widest point, and the length of the figure is $4\frac{1}{2}$ inches (11.4 cm.) from the forehead to the toes. Judging from celts of similar form, this specimen was originally about 7 inches (18 cm.) long. The celt is petaloid and is made of a green, slate-like stone, possibly of volcanic origin. It was found by a negro farmer in the bush in the vicinity of the "Betsy Bay" settlement on the west coast of Mariguana, and was taken home by the finder. It seems to have reposed in his cabin for several years, and the "Indian baby," as the negro called it, was finally given to his infant daughter as a toy, with the in-

evitable result that it was broken. With the aid of a few children the author was successful in discovering two of the fragments in the negro's yard. It is regretted that the remaining pieces could not be recovered.

The figure on the celt is shown in a seated posture and is carved in low relief. The knees and arms point inward and the hands

rest under the chin. The body itself is not shown. The fingers and toes are represented by shallow grooves. The head is indicated by a carved circle, of which, owing to the fact that the top of the celt is missing, not more than half can be seen. However, the right ear is still shown outside the circle. The eyes and mouth are cut in intaglio; the nose and the right eyebrow are in low relief. It is especially regretted that the top of the head is broken off, for it would be interesting to ascertain whether or not a feather head-dress of any kind had been represented. This would have served as a valuable basis of comparison with the two or three similar specimens known.

THE HEYE MUSEUM
NEW YORK CITY



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PRECOLUMBIAN DECORATION OF THE TEETH IN ECUADOR

WITH SOME ACCOUNT OF THE OCCURRENCE OF THE
CUSTOM IN OTHER PARTS OF NORTH AND SOUTH
AMERICA

BY MARSHALL H. SAVILLE

PRIMITIVE personal decoration, wherever found and however practised, is a subject of interest to the anthropologist.

Man was ever vain, fond of ornamenting his person in a multitude of ways. He early learned the art of painting, tattooing, and scarifying his face and body, and pierced his ears, nose, lips, and cheeks for the insertion of ornaments of various materials and divers shapes, fondly imagining that he added to his personal appearance thereby, through which he attracted the opposite sex. One of the most singular ways in which the love of facial decoration has found expression is that in which the teeth have been operated upon, either by painting or staining, or by filing or cutting the ends into different forms,¹ or, further, by the insertion of foreign substances into cavities artificially cut into or through the enamel in

¹ The work of von Ihering is the first general treatment of the custom of dental decoration. In his brief account of the practise of the custom among the American Indians, he confines himself to cases among tribes of modern times. Hamy was the first to present the proof of the occurrence of the custom in times anterior to the coming of the Spaniards in Latin America. He was also the first to give us examples of inlaying, as will be observed in the chronological bibliography which follows. In the present paper I do not take into consideration the filing of teeth as now practised in Brazil and other Latin American countries.

the front of the upper teeth. It is to this latter phase of dental decoration to which attention is called in this study. So far as we are aware, the type of decoration represented by the insertion of stone or metal into the teeth in the manner about to be described is not found outside of ancient America. The author has been interested in this subject for many years, having collected examples of decorated teeth in Oaxaca, Chiapas, Yucatan, and Honduras.¹ For the sake of comparison a brief reference will be made to some examples from Mexico and Central America, together with a list of authorities, at the end of this communication. The material from Ecuador, herewith published, has been collected in connection with the work of the George G. Heye Expedition in that country, and the specimens are now in the Heye Museum, New York.

In a communication to the International Congress of Americanists held at Vienna in 1908, in giving a brief résumé of the results of my first archeological trip to Esmeraldas, the writer said:

Another custom which we have found in Esmeraldas, and which, so far as we are aware, is not present in any other part of South America, is the decoration of the teeth by the insertion of inlays in small perforations cut in the enamel of the upper incisors. This custom of decorating the teeth was quite common in various parts of Mexico, where different settings were used. In the Mayan area, as far south as Salvador, the object most often used for the inlay was jadeite. In Mexico, for example in Oaxaca, I have found hematite used; in Vera Cruz, turquoise has been found; and in other parts, teeth with settings of rock crystal,

¹ I presented some notes on "Decoration of the Teeth in Ancient America" before the American Association for the Advancement of Science at the Detroit meeting in 1897. This paper was not published, partly by reason of the fact that I wished to collect more material bearing on the subject, but especially because of my long absence in Mexico on the work of the Loubat Expedition during the fall and winter of 1897-98. (See entry in the bibliography under date of 1899.) In 1901 Dr Lasch published in Vienna his paper on teeth mutilation and decoration in America. (See entry in the bibliography under this date.) Lasch mentions my account of finding teeth inlaid with hematite in Xoxo. He quotes my paragraph, "This ancient custom can now be traced from the Pueblo region of Arizona to southern Central America," and says, "Alas, Saville neglects to give his proof for the wide distribution of this custom." Dr Lasch unfortunately had not consulted several studies, entries of which I give in my bibliography, where he would have found published accounts of decorated teeth in Chiapas, Yucatan, and in Honduras and Salvador. Regarding the Pueblo region, I made the statement after having photographed a skull found by Dr Fewkes at Sikyatki, Arizona, a study of which seems to me clearly to indicate single serrations in at least three of the upper incisors and in the lower right lateral incisor.

obsidian, and a red cement, have been found. We have never heard of this custom in Colombia or Peru, but in Esmeraldas, in Atacames, skulls have been found with tiny discs of gold set into the teeth in the same manner as in Mexico and Central America, with the exception of the material. To our knowledge, among the thousands of mummies and skulls from Peru, inlaid or filed teeth have never been found, and it is a fact of very great significance in the study of the migrations of the ancient people of the west coast of Central America, and of northwestern South America.¹

Since writing the above, Boman's great work on the archeology of the Andean region of Argentina has appeared,² and he has presented a skull showing filed teeth which was found in the extreme northwestern part of that republic. He furthermore refers to filed teeth being found in the neighboring part of Bolivia by Crequi Montfort;³ but what I have said regarding the inlaying of teeth still holds true.

The only account from the early Spanish chroniclers which relates to the decoration of the teeth in Ecuador is found in the important work of Cieza de León. In treating of the province of Guayas in my *Antiquities of Manabi, Ecuador, Final Report*, I have cited this notice.⁴ Before mentioning this custom, Cieza

¹ See entry in the bibliography under date of 1909.

² The title of Boman's great work will be found in the entry under 1908 in the bibliography. The skull described by Boman, and illustrated by both Chervin and Boman, was found in Argentina, near the arroyo of Sayate, in the province of Jujuy, not far from the Bolivian and Chilean frontiers. Sayate is in about the latitude of Antofagasta of the Chilean seaboard. The skull is that of a child of about the age of seven years; it has three of the lower incisors filed, the other being missing. The upper teeth also are missing, hence we do not know whether these were filed.

³ Chervin, in his *Anthropologie Bolivienne*, after describing the Sayate skull, later treated in considerable detail by Boman, writes: "Nevertheless I found among the skulls coming from the graves of Tocari, near Yura, province of Porco, Department of Potosi (Bolivia), analogous mutilations, less distinct, less fine, if I may say so. It consists of a division worked by two strokes of a saw, approaching a right angle, and thus separating a triangular piece, the base of which is situated on the cutting edge of the tooth, and the point directed toward the root. (See especially skulls numbered 285, pl. 81, and 314, pl. 86.) There it is a simple variation of Sayate, which has its importance in that it shows us the geographical area of these dental mutilations is very considerable in this region."—Tome III, pp. 94-95.

⁴ See entry in the bibliography under date of 1910. Cieza de León was on the coast of Ecuador between the years 1540 and 1550, hence it is plain that the custom of inlaying the teeth with gold discs must have persisted for some time after the first coming of Pizarro in 1527.

enumerates several villages of the district, among them Colonche, Chanduy, and Chongon, towns which still exist along the coast of the region, between Manglar Alto and Guayaquil. He then proceeds: "In some of these villages the caciques and principal ones fasten bits of gold in their teeth." This undoubtedly refers to the style of dental decoration found in Esmeraldas province much farther to the north, where discs of gold were inserted as inlays into artificial cavities, as will be described later.

Bollaert, in his *Antiquarian, Ethnological, and Other Researches in New Granada, Ecuador, Peru, and Chile*, published in 1860, gives some information regarding the Esmeraldas coast which he received from M. Bourcier, formerly consul-general from France to Ecuador. He states that "large earthen vessels, containing chicha, have been disinterred, also a male skeleton, which had false teeth, secured to the cheek-bone by a wire of gold."

In his *Resumen de la Historia del Ecuador* Cevallos quotes from a report made about the coast of Esmeraldas during the early forties, to President Flores, and the statement which follows relates to a portion of the coast between La Piedra, at the mouth of Esmeraldas river, and Rio Verde, about twenty miles to the north. We translate from this account:

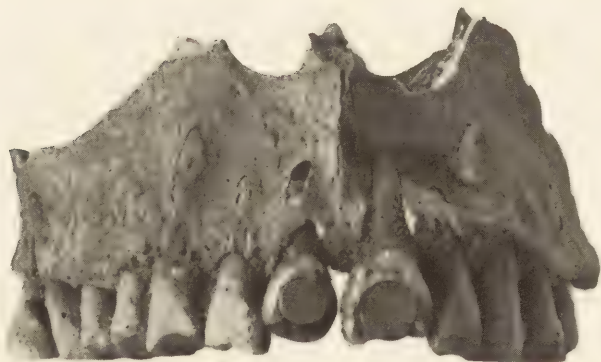
In the year 1836 the Señora María Montero de García found in opening a well in her garden a jar with the skeleton of a man; the skull was well preserved and the teeth were interlaced or intertwined with gold wire. Examining the jaws to see if the teeth were artificial, in which case the wire would have served to secure them, it was found that they were not, and that the gold served as a pure ornament or fancy of the individual.¹

It seems quite probable that this official account refers to the skeleton about which M. Bourcier gave information to Bollaert. The place where this discovery was made is in the immediate neighborhood of the locality in which was found one of the examples which I brought from Ecuador last summer. It is indeed unfortunate that we have no representation of this skull to further enlighten us concerning the style of decoration.

¹ Volume VI, the final volume of the work of Cevallos from which we take this statement, was first published in 1873. I quote from the second edition, volume VI of which was printed in 1889.



A. SKULL WITH TEETH INLAID WITH GOLD, FROM ATACAMES, ESMERALDAS, ECUADOR.
IN THE BRITISH MUSEUM



B. SKULL WITH TEETH INLAID WITH GOLD, FROM ATACAMES, ESMERALDAS, ECUADOR.
IN THE HEYE MUSEUM

In the spring of 1913, a Cholo, one of the natives of Atacames, a town in the province of Esmeraldas, about eighteen miles southwest of the city of Esmeraldas, found a skeleton in a burial tube in the right bank of the Rio Atacames, just above the town. The skull was found with the teeth inlaid with gold, but the finder contented himself by breaking off the superior maxillary, throwing the rest of the skull away. When I visited the town in June of the present year for the purpose of making some excavations to supplement my former work, I obtained the fragment. The two upper middle teeth are decorated by the insertion of thin gold discs in cavities drilled or bored in the enamel of the face of the teeth, as shown in figure 56, in the drawings in plate XIX, *d*, *e*, and also in the photograph shown in plate XVI, *b*. An unusual dental feat, in addition to the decoration, is found in the right middle tooth. This is not a right middle incisor, but a right lateral incisor (pl. XIX, *d*), which does not belong to the jaw but was implanted to replace the middle incisor. This is such an extraordinary feature that we must

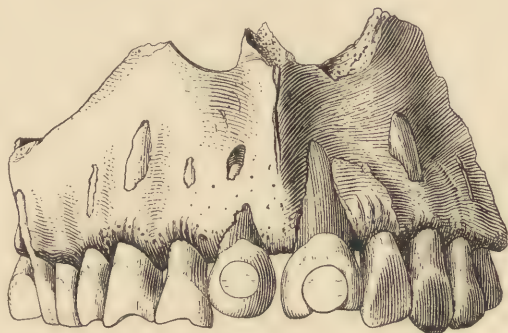


FIG. 56.—Teeth decorated by the insertion of thin gold discs.

weigh very carefully the evidence as to its having been found in the jaw. Everything is in favor of this position; indeed there is no reason to doubt that the replacement is a genuine precolumbian triumph of the ancient dentists of Atacames.

The occurrence of decorated teeth is extremely rare, very few specimens having been found, but this is not proof that the custom was not a common one in former times. The inhabitants of the little village are incapable of appreciating the archeological value of such finds, as they hold in little esteem objects of antiquity which are found in great abundance, and there is no market for

relics in this isolated place. The value of the gold inlays as bullion is very small; the owner sold the specimen for less than two dollars, and I could have obtained it for less, had I desired to follow the usual method of trade. The tooth fits perfectly into the socket, although, as a matter of course, it is not so long as the cavity, this space at the end being proof that the original tooth was replaced by the implanted one only a short time before death, otherwise the growth of the bone would have filled it.

Although I have never before seen an implanted upper tooth in ancient America, we have an example in a lower jaw which I uncovered in an excavation at Copan early in 1892. Dr Andrews, the well-known dental authority, has published a record of this find, as follows:

In the lower jaw of the skeleton was found the most interesting curiosity in the whole collection to dentists—a lower left lateral incisor that has been carved from some dark stone, and which has been implanted to take the place of one that had been lost. The tartar would seem to show that it had been worn for some time during life. This implantation antedates Dr. Younger's experiments by some fifteen hundred years.¹

In another paper, Dr Andrews writes:

The most interesting dental curiosity in the collection is an implanted tooth, made of some dark stone. It was found neatly fitted in the socket of an inferior left lateral incisor, and is shaped very much like the natural tooth. That it had been worn for some time during life was indicated by the thick incrustation of tartar upon it.²

The setting of the implanted left middle incisor of the Atacames specimen under consideration (pl. XIX, *e*) is a little larger than that in the right tooth, being a slightly irregular disc, 6.5 mm. in diameter, while the other inlay, a perfect disc, is only 5 mm. in diameter. The smaller disc, however, is slightly thicker than the larger one, being less than .5 mm. in thickness, the other being but .3 mm. The surfaces of the inlays are flat and polished. The larger one projects below the edge of the central part of the tooth, and viewing at it from the inside (pl. XIX, *f*), it appears to have been filed, and thus decorated before the insertion of the inlay. It is extremely

¹ See first entry in the bibliography of Dr Andrews, under date of 1893.

² See second entry in the bibliography of Dr Andrews, under date of 1893.



SKULL WITH TEETH OVERLAID WITH GOLD, FROM LA PIEDRA, ESMERALDAS, ECUADOR.
IN THE HEYE MUSEUM



probable that the left lateral incisor and the left canine exhibit decoration by filing (pl. XIX, *g*, *h*), and are not naturally worn down. This custom of filing the teeth, a quite common custom in ancient Mexico and Central America, is now found for the first time on the Pacific coast of South America, in case our presumption is correct, although, as has been already stated, Boman has recently reported it from Argentina.

The back teeth are very much worn, evidence that the decorated incisors were carefully taken care of, in order that the implanted tooth and the projecting inlay might not be injured.

A short time before my first visit to Atacames in 1907, a skeleton was found in a burial tube, which had the four incisors and the two canines of the upper jaw decorated with gold inlays. The finder, unfortunately, extracted the settings for the trifling value of the gold, and threw the skull away. I secured these six inlays, and they now form a part of the Esmeraldas collection in the Heye Museum. They are a little smaller than the two in the specimen just acquired, one being 4.5 mm. and the other five 4 mm. in diameter. Several other teeth with gold setting have been found at various times after floods, when the banks of the river were undermined, often uncovering burials. With one exception, outside of our own collection, they have been given away as curiosities. The exception noted is a fragment of a skull found in the early seventies and presented to the late J. S. Wilson. It is now in the British Museum.¹ This skull (pl. XVI, *a*) formerly contained eight gold inlays in the upper jaw, decorating the four incisors, the two canines, and the two bicuspid. Only the settings in the canines and the bicuspid remain, although the cavities in three of the incisors are found, while one of the incisors is missing.

We know, then, that the number of the teeth to be decorated was variable. Our examples have two and six, while the British Museum has eight inlays, the latter number being the extreme

¹ A drawing of this skull has recently been published in the *Short Guide to the American Antiquities in the British Museum*, written by Mr Joyce. See entry in the bibliography under date of 1912. I obtained a photograph of this specimen in 1895, which has been reproduced for several years among the plates of my unpublished work on the archeology of Esmeraldas.

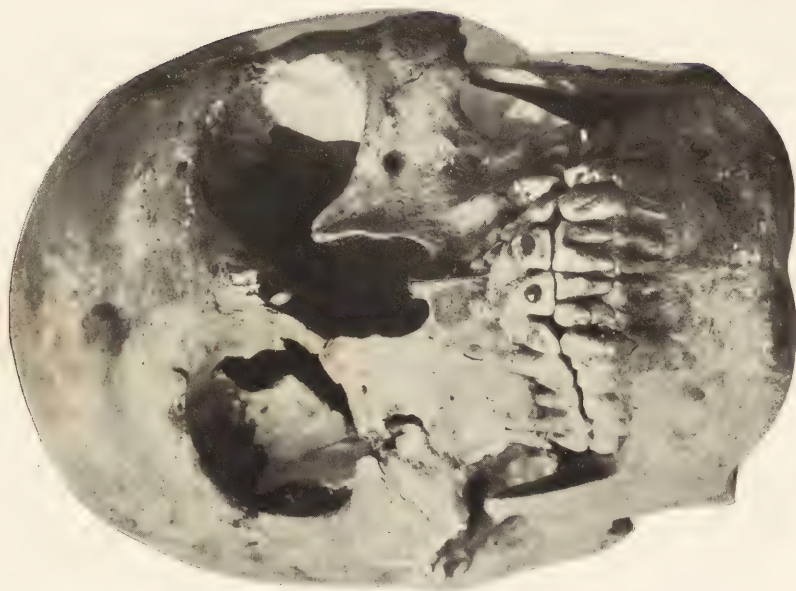
found by us in a skull from a tomb in the ruins of Copan, Honduras, where, however, the setting was of jadeite. It may be observed here that gold as an inlay has never been found thus far to our knowledge in North America or in South America outside of the Esmeraldas coast region. From Tomsupa, a few miles north of Atacames, we have two gold discs, one 4 mm. and the other 4.5 mm. in diameter, which are without doubt inlays from teeth. From La Tolita, more than a hundred miles to the north, we have numerous gold discs, of about the size of the Atacames specimens, which are probably inlays, but thus far, in the extensive diggings that have been carried on there in search of gold, no skulls with decorations have been found. I believe that when careful excavations are made in the many mounds on the island, skulls having gold decorations will be discovered. It is a curious fact that we do not find any indication of this type of facial decoration in any of the hundreds of pottery heads from La Tolita, but in reality our hasty survey of this area is hardly a scratch on the surface of this important archeological field.

By far the most transcendent example of teeth decoration which has at present come to light in America is in a skull discovered in 1909 at a place called La Piedra, near the point on the right bank of Esmeraldas river where it empties into San Mateo bay. It was accidentally found by Mr Pinzon and Mr George D. Hedian, the latter the American consular agent at Esmeraldas, and was kindly presented to me by Mr Hedian for the Heye Museum during my visit to Ecuador last summer. The skull was seen projecting from the bank, but no other parts of the skeleton were uncovered, probably having been washed away after the bank was undermined. The upper part of the skull is in fragments, but is restorable. The upper and lower jaws are somewhat flattened, having been crushed by the weight of earth, and still remain with the mass of earth in which they were imbedded (see pl. xvii, and fig. 57). The skull, slightly deformed, is that of an adult female. The decoration of the teeth is unique and presents a new type of facial ornamentation. Instead of small discs being set into artificial cavities, we find in this case, as shown in plate XIX, *c*, that certain teeth of the





A. SKULL WITH FILED TEETH IN UPPER AND LOWER JAWS, FROM MOUND 6, RUINS OF LABNA, YUCATAN. IN THE PEABODY MUSEUM OF HARVARD UNIVERSITY



B. SKULL WITH TEETH INLAID WITH JADEITE, FROM CHALCHICOMULA, PUEBLA, MEXICO. IN THE ETHNOGRAPHICAL MUSEUM OF MUNICH

upper jaw were almost entirely covered on the outer face by an *overlay* of gold. The entire enamel of the teeth decorated has been removed with the exception of narrow bands at the bases and the upper parts where they were close to the flesh and imbedded in the jaw. The removal of the enamel is through to the dentine and was skilfully accomplished. It appears that in some instances sawing was done slightly under the enamel at the upper part, so that the gold overlay, or covering, might be fitted under it in order to make it more secure. In one tooth there is a very tiny ridge on the right side where the enamel was left in a beveled line. The teeth thus practically

"face-crowned" are the four incisors and the two canines. The overlays are missing in all but one of the teeth, the left lateral incisor (pl. XIX, *c*). This gold covering is slightly folded or bent over each side of the tooth for greater security. The overlay measures 5 mm. in height, and has an extreme width of 8 mm. (an average of 7 mm.) on the face, while the clamped or bent-over

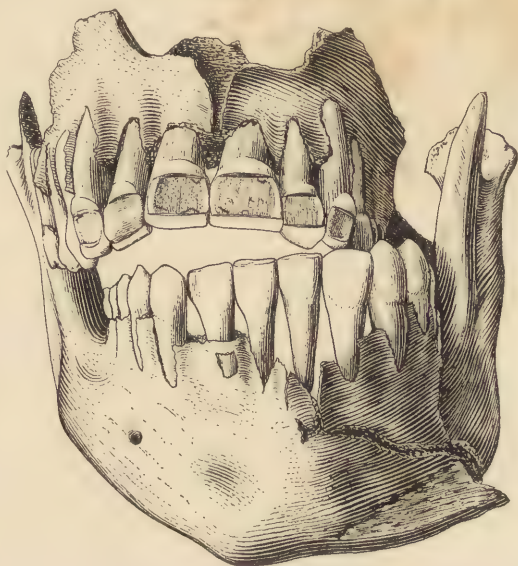


FIG. 57.—Upper teeth ornamented with overlay of gold.

section is too small to be measured. The teeth which have lost the overlays (a front and side view of one is given in pl. XIX, *a*, *b*) show that the cutting extends toward the dentine 1 mm. or a trifle more. In the left middle incisor the vertical cut is 6.6 mm.; the right middle incisor has a vertical cut of 6 mm.; while the canines have 5 mm. In some of the cuts traces of a cement which aided in holding the gold fast to the teeth may still be seen. The

polished surface of the remaining overlay does not come out to the face of the tooth; in other words, the gold is not so thick as the depth of the cut. Unlike the fragment of skull which contains the disc inlays described above, the teeth are not worn down, and are in a splendid state of preservation. The teeth decorated are those which show when the mouth is opened in speaking, and are so covered that they must have had the appearance in life of gold teeth.

This new phase of dental decoration exhibits a skill far in excess of that shown in the simple discs cut out of the enamel for inlays, as the removal of such a large part of the enamel required the most delicate work on the part of the operator so as not to injure the dentine and cause premature decay. Had the gold overlay not been tightly fitted over the exposed dentine, decay likewise would have been rapid, but there is not a trace of decay on the surfaces of the dentine where the overlays have been lost, nor is there any indication that the decoration was not worn for a considerable time during life, and I am of the opinion that the accidental finding of the skull is responsible for the lack of the five overlays, and that they were not lost during life.

One other type of decoration remains to be considered. On the first expedition to Esmeraldas, in 1907, my assistant, Mr Niendorff, was sent on a trip from Atacames southward to the frontier of the province of Manabí. At Tonchigue, a few miles south of Atacames, he made several excavations, and I quote from his report as follows:

One tube, twenty inches in diameter and two feet six inches high, contained a skeleton; the tube stood on an olla overlapping it about two inches. The olla was thirteen inches deep. On top of the tube there had been another tube overlapping the lower one by about five inches. Being so near the surface, the tube and the olla had been exposed to the elements for so long a time that I could not save the bones. A part of the top of the skull had been bleached white. On either side of the skull I found small pieces of copper wire which had been gilded. They were evidently earrings. Between the two upper front teeth I found a small spoon-shaped piece of gold [see fig. 58], bent around the tooth on the inside.



FIG. 58.—Tooth ornament of gold.

The teeth and the rest of the skull were so much disintegrated that Mr Niendorff was unable to preserve them. This gold orna-

ment has a small piece broken from it. As shown in the drawing, which is natural size, it is flattened out. It was bent around the tooth with the rounded side out, thus forming a type of decoration combining the disc and the band on the face of the incisor.

In our study of this subject we have found that various methods of decoration were in vogue along the Esmeraldas coast. The most common type was the inlay of small discs; we have also the overlay of gold bands in the enamel; again, as in the Tonchigue example, the binding around the tooth of a convex disc and bands; and, finally, the reported discovery in the thirties of the intertwining or interlacing of gold wire around the teeth. It should also be noted that the decoration was always in the upper teeth, and so far as we now know gold was always used as the material for the inlay. There is also the indication that filing of the teeth was practised.

In order to compare our Esmeraldas specimens with some of those found in Mexico and Central America, there are introduced in plate XIX a few drawings of teeth from this area. They show that in the art of inlaying substances in the teeth, the technique in Central America is identical with that of Esmeraldas. The examples *i* to *m* are inlaid teeth from Mexico and Honduras, exemplifying three different materials used as inlays. *i* is an upper incisor from Yucatan in the Berlin Museum; it has an inlay of turquoise, is not filed, and has a perforation on the side near the upper end of the root for suspension. Example *j* is from Tecolpa, Chiapas, not far from the ruins of Palenque.¹ I collected it in 1897, and it is now in the American Museum of Natural History. It is an upper incisor, has an inlay of jadeite, and is filed at each corner. Specimen *k* is from the ruins of Copan, Honduras; it was found in a tomb which I uncovered in 1892, and is now in the Peabody Museum of Harvard University.² This is an upper incisor, and is decorated in the same manner as the tooth from Tecolpa, being inlaid with jadeite and also filed. The tooth shown in *l* is also from Copan; it has an inlay of jadeite, but is filed only on the right corner.

¹ See entry in the bibliography of Troncoso under date of 1893.

² See entry in the bibliography under date of 1896.

An upper canine, *m*, is from Xoxo, Oaxaca. In my paper on Zapotecan tombs¹ I have described the finding of this tooth; it was excavated in an enclosure in front of a stone burial chamber in the center of Mound 5, with a number of human teeth which had been thrown in with a mass of other objects. Several of the teeth were ornamented by the insertion of small circular pieces of hematite averaging three-sixteenths of an inch in diameter. Several were also filed, and two had no setting but were filed at the corner. These are all upper teeth. The tooth illustrated has a hematite inlay, but is not filed. This specimen, with two other decorated teeth from the Xoxo tomb, are now in the American Museum of Natural History. The other teeth shown in plate XIX illustrate examples of simple filing. Specimen *n* the writer found in the Cave of Loltun, Yucatan;² it exhibits filing similar to that found in the skull which I also discovered in a tomb in the ruins of Labna, Yucatan, while engaged in the work of the Thompson Expedition of the Peabody Museum of Harvard University. This skull has been illustrated by Dr Andrews,³ but I give here, in plate XVIII, *a*, a front view, as the publications of Dr Andrews are not readily accessible. Teeth *o* and *p* of plate XIX are from a skull illustrated in Strebel's work, and are from Cerro Montoso, Vera Cruz. They exhibit a different style of filing, the first showing the presence of a double serrated edge, while the second has a single serration.⁴ All the teeth shown in the illustration are from upper jaws.

In all the examples of skulls with decorated teeth which I have seen, if the style of decoration is that of a simple inlay or a combination of inlay and filing in the same tooth, the teeth of the lower jaw are not decorated. Inlaying is confined strictly to the teeth of the upper jaw. If the upper teeth, however, are only filed, then in a number of instances we find the lower teeth filed with a single or a double serration, as in the examples of upper teeth shown in *n*, *o*, *p*, of plate XIX. Unfortunately, only one of the

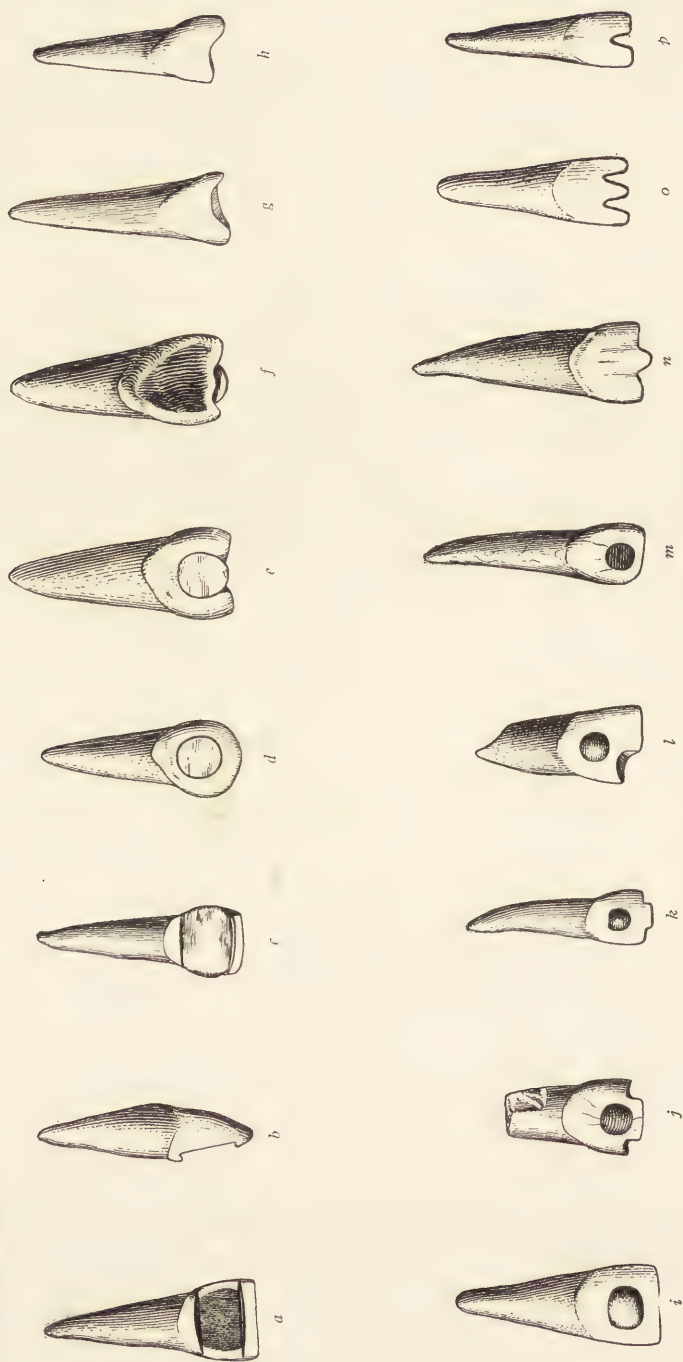
¹ See entry in the bibliography under date of 1899; also the entry of Batres under date of 1902.

² See entry in the bibliography under date of 1897.

³ See entries in the bibliography under date of 1893.

⁴ See entry in the bibliography under date of 1885-89. These teeth are found in a skull figured in tome I, pl. VIII, fig. 18.





DECORATED TEETH SHOWING OVERLAY, INLAY, AND FILING

skulls with filed upper and lower teeth which I have seen has all of the teeth in place, namely, the example from Labna, where the six upper teeth, incisors and canines, are filed; and the eight lower teeth, incisors, canines, and bicuspid, are also filed. In other skulls it is impossible to state how many of the lower teeth were thus decorated. In the Mexican and Central American area, what I have written about the variability of the number of teeth to be decorated in Esmeraldas is also true.

In figure 59 is illustrated the fragment of upper maxillary figured by Hamy.¹ It is one of two examples of the kind with inlaid teeth from Mexico which we have ever seen published; other specimens showing this custom are simply isolated teeth separate from the jaw. It is from Campeche, Mexico, and indicates that

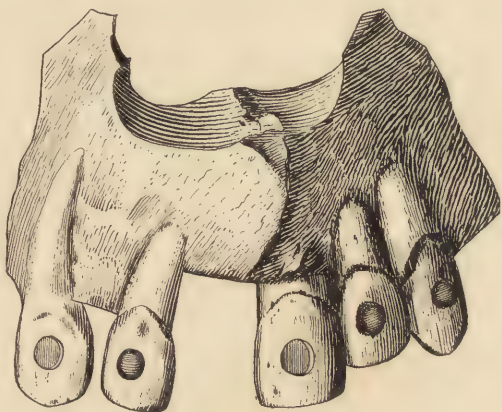


FIG. 59.—Upper teeth inlaid with gold. From Campeche, Mexico. (After Hamy.)

at least six of the teeth were decorated—the four incisors and the canines. The right middle incisor is missing, and the settings of turquoise are lacking in the cavities cut in the left middle incisor and in the right canine.

The other example is in a complete skull from Chalchicomula, state of Puebla, Mexico, which has recently been illustrated by Dr Walter Lehmann; it is now in the Ethnographical Museum in Munich. In this, the only complete skull with decorated teeth which has been published (see plate XVIII, *b*), the two upper incisors are ornamented with small circular inlays of jadeite, somewhat smaller than the average inlays in other decorated teeth which I have examined.

¹ See entry in the bibliography under date of 1882.

Comparing these specimens with our Atacames fragments, the close similarity is evident, especially in the specimen in the British Museum and the Campeche fragment, the inlays in both specimens being of the same size.

I cannot help expressing the opinion that the custom of inlaying teeth as found on the Ecuadorian coast has come directly from Central America, and that future explorations of the George G. Heye Expedition to the north, along the Colombian coast, will probably bring to light other examples of this custom in the region separating the coast of Ecuador from Central America. It would be premature at this time to dwell on the question of a connection between the coast cultures of Ecuador and Central America, but it might be stated, in conclusion, that we have several other points of contact which seem to be indicated in a study of our extensive collections from the province of Esmeraldas. This is a subject which we reserve for consideration in our forthcoming monograph on *The Archeology of Esmeraldas*, which will appear as Volume III of our *Contributions to South American Archeology*.

The interesting questions will be asked, How was the work of cutting the teeth accomplished? and How was the patient able to withstand the pain of the operation done with the most primitive of tools? The only information that sheds light on the first query is found in the work of De Landa, who, writing about the native population of Yucatan, the Mayas, says: "They had the custom of sawing the teeth, leaving them like the teeth of a saw, and this they did for elegance or show; the work was done by the old women, filing them (the teeth) with certain stones and water."¹ This probably explains the process employed by the people of Esmeraldas and Argentina in filing the teeth and in cutting out the enamel for overlays, as shown in La Piedra skull; but, in cutting the cavities for inlay work, stone drills, or perhaps either hollow bone or cane drills, were employed with sand and water. No metal tools have yet been discovered in Esmeraldas or elsewhere in Ecuador by which the work could have been done. All the copper celts and

¹ The work of Diego de Landa, entitled *Relación de las Cosas de Yucatán*, was found and first published by Brasseur de Bourbourg in 1864. I translate from the edition of Brasseur (p. 345) after comparing the paragraph with the text of the two later editions.

axes are large, and we have only a single small copper implement, an awl, from Esmeraldas. We must not forget that to the present time hardly any archeological work has been done in this section of South America. Our own explorations thus far have been little more than a preliminary reconnoissance of the region. Later, tools suitable for the fine dental work exhibited by these specimens may be uncovered by the spade of the investigator. I believe, however, that copper is too soft to have been used successfully for cutting so hard a substance as enamel, hence it is fairly evident that other materials must have been employed as tools by the ancient dentists.

Regarding the other question, as to the ability of the patient to bear the discomfort and pain of the operation, is it not possible that these people had discovered the properties of coca in producing local anesthesia? We know from archeological evidence, which I have brought out in my work on Manabi,¹ that the people of the coast were addicted to the use of coca, chewing the leaves, mixed with lime, exactly as do the Indians of today in a large part of western South America. In view of this fact, it does not seem unreasonable to advance the hypothesis that coca may have been used, in some form, in dental work in this area, where, without question, a little-known branch of the South American Indians reached a high state of aboriginal culture.

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Von Ihering devotes a small space at the end of the paper to the filing and other mutilation of teeth in America.

- HAMY, E. T. Les mutilations dentaires au Mexique et dans le Yucatan. In *Bulletin de la Société d'Anthropologie de Paris*, 3^e série, tome V, p. 879, Paris, 1882.

- 1883 HAMY, E. T. Mutilations dentaires des Huastèques modernes. In *Bulletin de la Société d'Anthropologie de Paris*, 3^e série, tome VI, pp. 644-645, Paris, 1883.

¹ See entry in the bibliography under date of 1910. In this volume (pp. 183-187) I have discussed this subject, and in plates LXVII-LXVIII have illustrated some vessels of shell and clay which were used to contain the lime mixed with the masticated coca leaves. These objects were found with skeletons in graves excavated by the George G. Heye Expedition at Cerro Jaboncillo, Manabí.

These studies are republished by Dr Hamy under the title "Mutilations dentaires des Huastèques et des Mayas," in *Décades Américanæ, Mémoires d'Archéologie et d'Ethnographie*, 3d and 4th Decades, xxvii, pp. 88-94, figs. 14, 15, Paris, 1898.

Dr Hamy figures the fragment of an upper jaw of a skull from Campeche which has the teeth inlaid with turquoise.

1885-

1889 STREBEL, HERMANN. Alt-Mexiko, 1885, Tafel VIII, fig. 18; Zweiter Teil, 1889, Tafel IX, fig. 14. Hamburg und Leipzig, 1885-1889.

In the first illustration Strebel gives a skull from Vera Cruz with filed teeth in the upper jaw; in the second plate cited he illustrates a tooth inlaid with obsidian, also from Vera Cruz.

1890 LEÓN, NICOLAS. Anomalías y Mutilaciones Etnicas del Sistema Dentario entre los Tarascos Pre-Colombianos. In *Anales del Museo Michoacano*, 3d year, pp. 168-173, 1 pl., Morelia, 1890.

Illustrates and describes a skull from Michoacan with filed teeth in the upper and lower jaws.

1892 PECTOR, DÉsirÉ. Notice sur l'archéologie du Salvador précolombien. In *Internationales Archiv d'Ethnographie*, tome V, pp. 112-116, Leiden, 1892.

This paper is a résumé of the work of Montessus de Ballore, *Le Salvador précolombien*, a portfolio of 25 plates published in Paris in 1891. Pector calls attention to what appears to indicate filed teeth in several of the pottery specimens. I fail to find any marked examples of this custom, except in two animal heads in which the teeth are pointed, and in a face, probably representing the mask of Tlaloc, in which two of the teeth are cut. In the human heads nothing of the kind is found.

PINART, A. L. Déformations dentaires artificielles chez les Indiens de l'isthme de Panamá. In *Compte-rendu Congrès International des Américanistes*, VIII^e session, Paris, 1890, p. 340, Paris, 1892.

1893 PASO Y TRONCOSO, FRANCISCO DEL. Catálogo de la Sección de México, Exposición Historico-Americana de Madrid, 1892, tomo II, p. 381, Madrid, 1893.

Mention is made of the collecting of teeth, filed and inlaid with jadeite, in Tecolpa, Chiapas. In 1897 I collected a tooth of the same character in Tecolpa, which is now in the American Museum of Natural History.

ANDREWS, R. R. Prehistoric Crania from Central America. In *International Dental Journal*, reprint, 4 pp., 1 pl., 4 figs., Boston, 1893.

ANDREWS, R. R. Prehistoric American Dentistry. In *Dental Practitioner*, reprint, 3 pp., 2 ill., Buffalo, 1893.

In these two papers Dr Andrews figures and describes a skull from Labna, Yucatan, with teeth filed in the upper and lower jaws, and also teeth filed and inlaid with jadeite and a red cement, from Copan, Honduras, all excavated by Saville. These specimens are now in the Peabody Museum of Harvard University.

1896 SAVILLE, MARSHALL H. Prehistoric Ruins of Copan, Honduras. *Memoirs of the Peabody Museum of American Archaeology and Ethnology*, Harvard University, vol. I, no. 1, pp. 30, 32, text figs.

Several of the filed and inlaid teeth are illustrated and the finding of them is mentioned in the report on the excavation of the tombs.

- 1897 THOMPSON, EDWARD H. Cave of Loltun, Yucatan. Report of Explorations by the Museum, 1888-89 and 1890-91. *Memoirs of the Peabody Museum of American Archaeology and Ethnology, Harvard University*, vol. I, no. 2, p. 20, fig. 16.

Illustrates three filed teeth found by Saville, while in charge of the work of the Thompson Expedition, in the Cave of Loltun, Yucatan.

- 1899 SAVILLE, MARSHALL H. Exploration of Zapotecan Tombs in Southern Mexico. In *American Anthropologist*, N. S., vol. I, pp. 354, 361-362, April-June, 1899.

Mentions the finding of filed teeth and teeth inlaid with hematite in a tomb excavated in Xoxo, Oaxaca, by the Loubat Expedition. Several of these teeth are in the American Museum of Natural History, New York.

- 1901 LASCH, RICHARD. Die Verstümmelung der Zähne in Amerika und Bemerkungen zur Zahndeformierung im Allgemeinen. In *Mittheilungen der anthropologischen Gesellschaft in Wien*, Band XXXI, pp. 13-22, Vienna, 1901.

A general treatise on teeth mutilation in ancient America.

- 1902 BATRES, LEOPOLDO. Explorations of Monte Alban, Oaxaca, Mexico, pp. 9-10, fig. 3, México, 1902.

In this account of the explorations carried on at Monte Alban, Batres illustrates a filed tooth inlaid with hematite which he states he found in a crypt in Xoxo. This is not so. The tooth is one of those found by me, and became the property of the Museo Nacional, Mexico City, in the division of the material found by the Loubat Expedition.

- LUMHOLTZ, CARL. Unknown Mexico, vol. II, pp. 426-427, 1 ill., New York, 1902.

Lumholtz illustrates a skull with filed teeth in the upper jaw. In exploring an ancient burial place near Zacapu, Michoacan, Lumholtz found a number of skulls with filed teeth in both the upper and the lower jaw. These skulls are in the American Museum of Natural History.

1907-

- 1908 CHERVIN, A. Anthropologie Bolivienne. Publication of the *Mission G. de Crequi Montfort et E. Senechal de la Grange*, 3 volumes, Paris, 1907-1908.

In tome III Chervin illustrates a skull with filed teeth from Sayate, Argentina, and also two skulls from the Department of Potosí, Bolivia, which he states have filed teeth. The illustrations are small and do not clearly show this feature. See tome III, pp. 93-98, figs. 29-33, pl. 36, and pl. 81, no. 285, pl. 86, no. 314; also p. 59, fig. 26.

- 1908 BOMAN, ERIC. Antiquities de la Region Andine de la République Argentine et du Désert d'Atacama. Publication of the *Mission Scientifique C. de Crequi Montfort et E. Senechal de la Grange*, tome II, pp. 579-589, pl. XLVII, figs. 113-114, Paris, 1908.

Boman gives considerable attention to the subject of decorated teeth, citing various authorities, and illustrates a skull with filed teeth from northwestern Argentina, collected by the expedition.

- 1909 SAVILLE, MARSHALL H. Archæological Researches on the Coast of Esmeraldas (Ecuador). In *Verhandlungen des XVI Internationalen Amerikanisten-Kongresses*, Wien, 1908, p. 344, Vienna, 1909.

First notice of the finding of skulls with teeth inlaid with gold in Atacames.

- 1910 SAVILLE, MARSHALL H. The Antiquities of Manabi, Ecuador, Final Report. *Contributions to South American Archeology*, vol. II, pp. 8-9, New York, 1910.

- 1912 JOYCE, T. A. A Short Guide to the American Antiquities in the British Museum, pp. 36-37, 1 ill., London, 1912.

Joyce figures a broken skull from Atacames, Ecuador, with the teeth inlaid with gold. The photograph which we reproduce in this paper was taken for the author in 1895.

LEHMANN, WALTER. Berichte des K. Ethnographischen Museums in München, IV (1911), pp. 101-102, Abb. 28, Munich, 1912.

Lehmann figures and describes a skull with two teeth inlaid with jadeite. He also calls attention to several other instances of decorated teeth but gives no general account of the subject.

HEYE MUSEUM
NEW YORK CITY

CERTAIN KITCHEN-MIDDENS IN JAMAICA

BY

THEODOOR DE BOOY

DURING a sojourn on the island of Jamaica in the months of January, February, and March, 1913, in the interest of the Heye Museum of New York City, the author was enabled to excavate some of the typical aboriginal kitchen-middens found in various parts of the island. These middens shed much light on the mode of life of the pre-Columbian inhabitants, and above all, allow a practically exact determination of their different foodstuffs. At the same time, such ceramic fragments and other artifacts as one can find—and they occur in great quantities—are most valuable for comparative studies of prehistoric cultures in the West Indies.

The modern equivalent of the kitchen-midden is the ash-heap: where, nowadays, we cast our broken kitchen utensils, bottles, and empty cans, the natives threw their broken pots and cooking-slabs, their shells, and such stone artifacts as happened to break in the making or during use. It can therefore readily be seen what important conclusions can be drawn from the varied specimens found in a midden. The author considered himself especially fortunate in being able thoroughly to examine and excavate a number of these refuse heaps.

The writer wishes to express his sincere thanks in behalf of the Heye Museum and himself to the Reverend J. P. Hall, of Brown's Town, Jamaica, for facilities given him in this work, for generous permission to excavate, and for the material from the middens and from other sources presented to the Heye Museum.

In Dr J. F. Duerden's work on the archeology of Jamaica¹ the following paragraph can be found on page 19:

¹ Aboriginal Indian Remains in Jamaica, *Journal of the Institute of Jamaica*, vol. II, no. 4, Kingston, 1897.

RETREAT.—These deposits are on the property Retreat, situated between Brown's Town and Stewart Town, in St. Ann, about four miles from the former. The land is now owned by Mr Roper, but was formerly in the possession of Mr Moulton Barrett. Miss Moulton Barrett made a number of investigations at the place and lent to the Anthropological Exhibition a collection of pottery fragments obtained. . . . The hill or ridge upon which the kitchen-middens are found is about 1,200 feet high, and six miles from the sea. . . . The elevation in question was very significantly known by the former owners as "Cacique's Ridge," and is also known as Little Nigger-ground Hill, while a higher one near has the title of Big Nigger-ground Hill. These latter names recall the fact that in slavery days the particular spots were used by the Negroes as provision grounds. . . . Excavations were made at numerous spots, and, in all, scattered amongst the upper dark loose earth and fragments of limestone, were broken pieces of pottery, quantities of land shells, a few specimens of marine shells, and the bones of the Indian coney and of various fish. This foreign material extended in several places to a depth of two feet. In one a deposit of partially indurated bluish-gray ash and charcoal gave evidence of the use of fire by the builders of the refuse-heaps.

At the time of the author's excavations the Retreat property was owned by Mr Hall, and since the investigations of Dr Duerden in 1896 no excavations had been conducted on Little Nigger-ground hill. Figure 111 shows the top of the hill. The actual crest of the hill is almost level, and the middens can be readily seen on the northern, eastern, and southern slopes, around the crest. The author determined sixteen middens with accuracy by digging small test-holes in the soil wherever there was a hummock. There may be several more middens on the hill, which in the course of time have altered in shape or the original summit of which has been removed by the excavations of Dr Duerden and previously by those of Miss Moulton Barrett.

The western part of the top of Little Nigger-ground hill is a rocky woodland. There was no proof that it had been used as part of the village site, nor could evidence of burials be discovered.

Little Nigger-ground hill (fig. 112) is situated about six miles from the sea. It does not afford a view of the sea, as it rises between the surrounding hills; but sentinels could readily perceive the approach of marauding Caribs and give ample warning to enable escape to the neighboring hills in the interior in case of a raid. An old road, in reality little more than a footpath, still extends from the hill to the sea, and is reported to have been made by the Spaniards. It is quite within the bounds of probability that this road

was an aboriginal path, and that the Spaniards afterward used and enlarged it for their own purposes. The plain due north of Little Nigger-ground hill is fertile and suggests an ideal place for the cultivation of cassava.

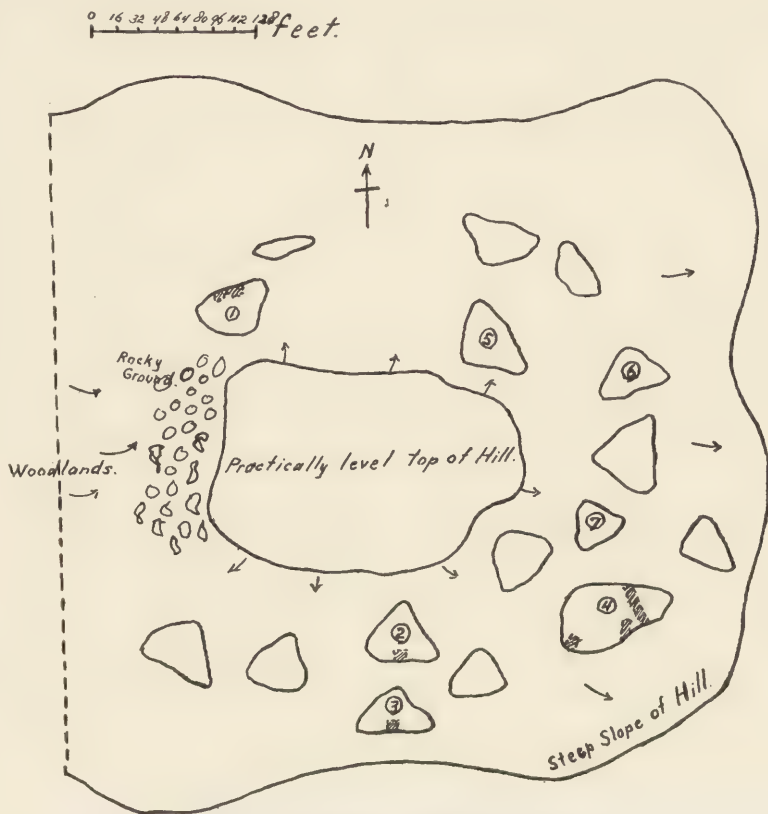


FIG. III.—"Retreat" village and middens.

EXCAVATIONS IN THE MIDDENS

Excavations were commenced in the midden marked 1 in figures III and II3. This midden is on the northern slope of the hill, and, as can be seen on the plan, is somewhat isolated from the other middens, there being a very small midden in front of it, but otherwise no other mounds within 160 feet. Midden 1 is 42 feet long and 30 feet wide; the crest has a height of 4 feet above the slope.

Excavation in this midden produced the same kind of material as afterward was found in midden 4, of which a detailed account follows. As three trenches were dug in midden 4 and only one in

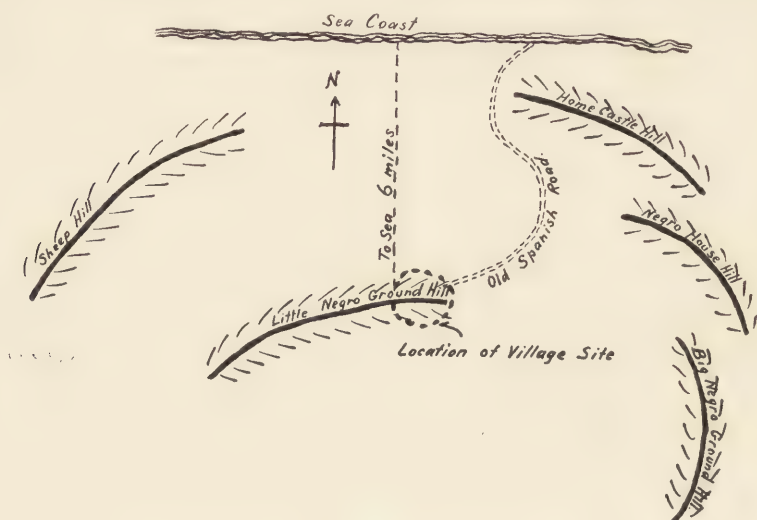


FIG. 112.—"Little Negro-ground" hill, with neighboring hills. (Not to scale.)

the first midden, it is preferable to give the detailed account of the excavations in the larger refuse heap. It is, however, of interest to note that such pottery fragments as were found in midden 1 were



FIG. 113.—Side elevation of "Retreat" village site, looking south, showing middens on slope. (Not to scale.)

far more brittle and were smaller than those from the other accumulations. This was due probably to the better drainage of the southern slope of the hill.

Midden 2 is on the southern slope of the hill and did not produce much material. This midden has a more pointed crest than any of



a. LONG TRENCH CUT THROUGH MIDDEN 4



b. CUT IN MIDDEN 4, SHOWING SHELL DEPOSITS



the others and could not have afforded space for more than a single hut.

Midden 3 is directly south of midden 2, but about twenty feet lower down on the slope of the hill. This midden also was not very productive, but, on the other hand, the sherds were in far better condition than those from the other sites.

It was in midden 4 (figs. 111, 114, 115) that the most extensive excavations were made. The latter part of these excavations was not made with the purpose of obtaining more archeological material, but with the idea of procuring as accurate information as possible regarding the location of the huts and the exact limits of the shell and ash deposits.

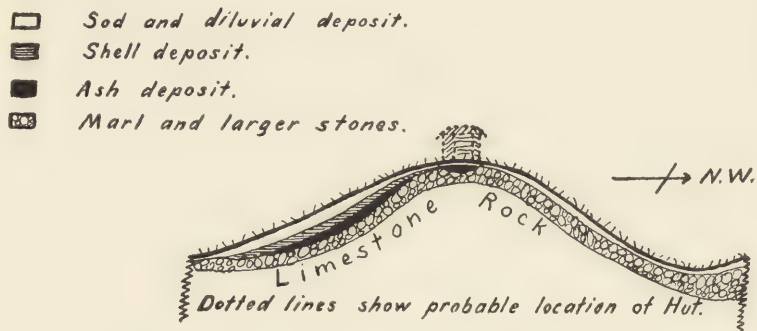


FIG. 114.—Cross-section of midden 4. (Not to scale.)

As in all previous excavations on Little Nigger-ground hill, an enormous number of land-snail shells were unearthed; indeed, from test-holes dug in midden 4, the author computes that this midden alone contained more than 300 cubic feet of shells.

Three trenches were dug in this midden, besides a large number of test-holes. The first trench (A, fig. 115) was 14 feet long by 10 feet wide, with varying depth down to marl. This trench extended in a south to north direction. At the most northerly point the marl came immediately under the diluvial deposit and the sod, and no shells, ashes, or artifacts were found. The second trench (B) was 38 feet long by 10 feet wide and followed a southeast-northwest direction, with a depth of four feet at the southeastern end, down

to marl, and a depth of less than a foot on the crest. This trench was purposely continued beyond the crest, with a view of verifying the test-holes previously dug. As will be shown later, this long trench gave important testimony as a basis for a hypothesis concerning the exact location of the aboriginal abode. The third trench (C, fig. 115) was 10 feet long and 10 feet wide.

At the point marked B, the author started the second trench by having the sod and diluvial deposit removed. This was a foot thick at the base of the midden, where the trench was begun. Proceeding toward the crest, after a distance of a foot, a layer of shells was found under the diluvial deposit, which layer gradually

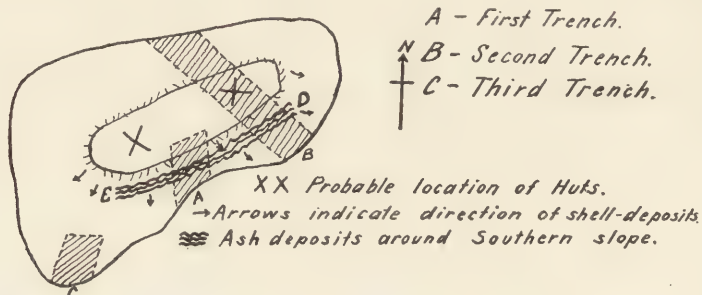
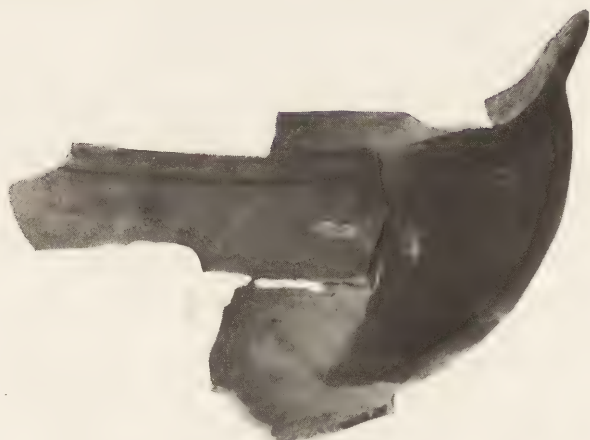


FIG. 115.—Top view of midden 4. (Not to scale.)

increased from a thickness of six inches at the very base to a thickness of a foot about two feet inward, and then tapered gradually to a single shell or two at the summit of the mound. Following the trench down the opposite slope, no shells were found. Mingled with the shells on the southern slope of the midden were the artifacts, such as worked stones and pottery fragments, many of the latter in excellent condition. The ash deposit commenced four feet above the foot of the slope and continued to the summit. This deposit was from 8 to 12 inches in thickness, and in it were found sherds, bones, worked stones, etc. No ashes were found on the northern slope of the midden. Test-holes showed that the ash deposit extended round the southern slope, covering in all about half the circumference of the midden, while the shell deposit covered about 270 degrees of the circumference. On the crest of the midden two

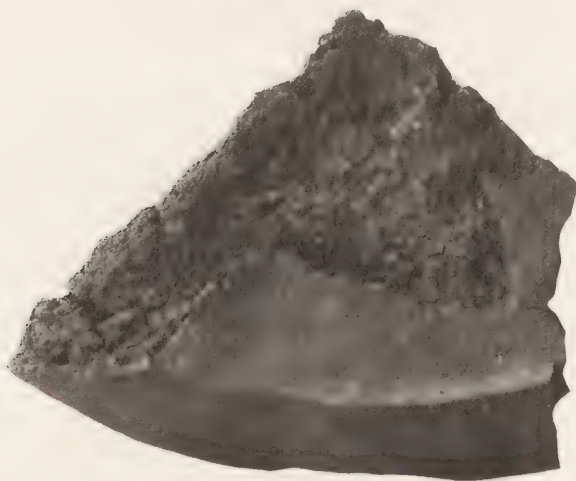


a



b

a, b. FRAGMENT OF BOAT-SHAPED VESSEL. (THREE-FOURTHS)



c

FRAGMENT OF CLAY GRIDDLE. (ONE-HALF)



ash-pockets were found, about two feet in diameter and 12 inches deep, surrounded by stones about the size of a man's head. The presence of these ash-pockets is problematical, as the aborigines certainly did not need a fire to keep their abode warm in a tropical climate, and the semicircle E—D (fig. 115) around the hummock supports the theory that cooking was done on the slope of the midden rather than on the crest. It is not from the two ash-pockets, but from the direction of the shell and ash deposits, that the author reaches the conclusion that the aboriginal abode was situated on top of the hummock and has formed the theory that the inhabitants threw the refuse and the discarded artifacts in three quadrants of the circle: in other words, in all directions save one, which afforded them at least one clean, clear space in front of the hut.

That the native made use of a natural rise of the ground on which to build his hut can plainly be seen in plate XXXI, *a*, which illustrates the long trench (B) cut through midden 4. It can here be seen that the contour of the midden is practically the same as that of the surface of the ground, as the trench was cut down to marl and all loose earth, shells, and ashes had been taken out before the photograph was made.

A good idea of the shell deposits can be had from figure *b* of the same plate, in which a section of trench A in midden 4 is shown. In all the middens on Little Nigger-ground hill at least 98 per cent. of the shells found were those of land-snails, the remainder being sea-shells. The author gathered specimens of the different species and a later examination identified them as follows:

Pleurodonte acuta
Pleurodonte acuta ingens
Pleurodonte sinuata
Sagda alligans
Arca noae

Arca dehayesi
Livona pica
Fasciolaria distans
Avicula
Strombus gigas

Various small animal bones were found in the middens, but the identification of these has not been possible. It is certain, however, that some of them belonged to the utia (*Capromys*). There also were many fish-bones, and these for the greater part have been

identified as belonging to the rock-fish (*Mycteroperca*), which at the present time is regarded as one of the most edible fishes in the Caribbean.

ARCHEOLOGICAL SPECIMENS FROM THE MIDDENS

The predominating type of pottery vessel in these middens, as well as in other middens of Jamaica investigated by the author, is a boat-shaped type, and while naturally no entire vessel was found, enough remains of several of them to show their form quite distinctly. In plate XXXII, *a*, *b*, is shown part of a vessel of this type, made of a dark-red clay, partly blackened either in the firing or by usage. The wall of the vessel is not more than one-eighth of an inch thick, and with the exception of the handle, which shows a few simple incised lines, it is undecorated. The rim is incurving and has a banded edge.

Many of these boat-shaped vessels have handles that are more elaborately decorated, and one occasionally finds handles that show a conventionally modeled parrot's head. Human heads also are depicted. Plate XXXIII, 1, shows some of the handles of these types. Fragments of decorated rims also were found in abundance, the decoration consisting chiefly of straight-line incisions, while serrated lugs under the rim are not uncommon.

The difference between Jamaican pottery and that from the neighboring islands impressed the author as being quite considerable; this is especially noticeable in the type of handles and in the fact that in the rectilinear decorations on sherds from most of the other islands an indentation made with the same tool that made the incised lines is found, which does not occur on any of the many hundreds of sherds collected by the author in Jamaica. This feature is described by Dr J. Walter Fewkes¹ as follows:

A marked feature in rectilinear decoration is the indentation of the extremity of each line. The potter commonly terminated a line with a shallow pit that was apparently made with the same instrument as the line itself: or it was sometimes slightly separated from the end of the line. So constant, almost universal, is this feature that it may be looked on as characteristic of pottery from Porto Rico and Santo Domingo.

¹ The Aborigines of Porto-Rico, *Twenty-fifth Annual Report, Bureau of American Ethnology*, Washington, 1907, p. 180.



1. HANDLES OF VARIOUS TYPES. (TWO-THIRDS)



2. SHERDS WITH INCISED DECORATION. (ONE-HALF)



3. TYPICAL JAMAICAN HANDLES. (TWO-THIRDS)



This feature was also noted by the author in the sherds found on the Caicos islands and the Bahamas, which, on comparison, can hardly be distinguished from Santo Domingo sherds. Dr Fewkes also says (page 188) in the work referred to:

Illustrations *b*, *c*, and *d* are representations of fragments of pottery from Nipe Bay, Cuba, and show the striking resemblance between the ceramics of Porto Rico and those of the largest of the Antilles.

It would therefore appear that the Jamaica pottery should not be included in the culture-type of that of Porto Rico, Hayti, Cuba, and the Bahamas, but that it belongs in a class by itself. It is rare to find impressed decorations on Jamaican pottery, and in the few instances in which it is found, the ornamentation is crude. On the other hand, as can be seen in plate XXXIII, 2, some of the incised decorations are fairly elaborate.

The middens of Little Nigger-ground hill also produced a type of handle that is not found in the other West Indian islands. Dr Duerden figures one of this type in his monograph above referred to, and it seems to be found in middens in various parts of Jamaica, with only slight variations in size and decoration. Plate XXXIII, 3, illustrates a few handles of this type. Whereas all the pottery previously described has a uniform thickness of from one-eighth to three-sixteenths of an inch, the thickness of the vessel to which this type of handle belongs is at least a quarter of an inch, and increases to not less than half an inch at the back of the perforation. Raised, serrated ornamentation is shown under the perforations in some cases (pl. XXXIII, 3, *a*); in other specimens two small lugs were added by the potter (*c*); again, a kind of scrollwork (*b*) is employed, as if the potter endeavored in her crude way to represent the tentacles of an octopus; while in *d* and *e*, two fragments belonging to the same vessel, an attempt may have been made to indicate a mouth, belonging to a face, of which the ridge between the perforations would represent the nose and the perforations the eyes.

Besides earthenware vessels, the middens also produced many fragments of clay griddles (pl. XXXII, *c*). These are about an inch thick at the base and taper to a thickness of half an inch in the

middle. They had a diameter of about 14 inches, but one finds only comparatively small fragments of these objects, which more than likely is due to the fact that the action of fire made them more brittle than the other ceramic objects.

The author found the usual worked stones in the middens, consisting of celts of the petaloid type, hammerstones, and rubbing and smoothing stones. A single specimen of shell celt was found, fashioned from the lip of a conch.





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PORTO RICAN ELBOW-STONES IN THE HEYE MUSEUM,
WITH DISCUSSION OF SIMILAR OBJECTS
ELSEWHERE

By J. WALTER FEWKES

INTRODUCTION

MANY prehistoric stone objects found in Porto Rico have taxed the ability of archeologists to explain and have furnished the theorist with abundant material for speculation. Among these may be mentioned three-pointed idols, both with and without animal or human heads. Other forms, from their resemblance to horse-collars, have from the first been designated as collars or collar-stones. Those prehistoric Porto Rican stone objects that, from their shape, are called elbow-stones, are the least known and apparently one of the most enigmatical types. The splendid Antillean collection of George G. Heye, Esq., of New York, contains undescribed examples of all these problematical objects, and of these the three elbow-stones here described for the first time are among the most important.

Elbow-stones resemble, in general form, fragments of broken collars, but a detailed study of various elbow-stones and comparison with stone collars, rather than bearing out this seeming resemblance, tends to show that they form types distinguished by highly specialized characters.

The elbow-stone type of objects is represented by twelve specimens in the archeological collections studied by the author. Objects of this type are therefore less numerous than the collars, of which there are about one hundred in different collections. Elbow-stones have not been found in Cuba, Jamaica, or the Lesser Antilles, and have never been reported from the American mainland. Their distribution in the West Indies corresponds closely with that of stone collars and three-pointed stones, which are practically confined

to Porto Rico, Hispaniola (Haiti and Santo Domingo), and possibly eastern Cuba. The author is of course aware that stone collars and three-pointed stones have been recorded from certain of the Lesser Antilles, but their number, or rather their relative proportion to other prehistoric objects from the same islands, is so small that he is inclined to question the recorded provenance of these specimens. Thus the late Professor O. T. Mason described and figured a single collar in the Guesde collection from Guadeloupe, and M. Alphonse Pinart ascribed another specimen of this type to the same island. Among several hundred stone objects from St Vincent the author has not seen a single collar or three-pointed stone, and he therefore reasonably suspects that the locality of the single broken fragment of the latter type ascribed to St Vincent by Mr Joyce¹ is doubtful. It is the writer's belief that these objects are not indigenous to the Lesser Antilles.² With a collar in the British Museum described by Joyce and said to have been found in St Thomas, Danish West Indies, the case is somewhat different. St Thomas, St Croix, and neighboring islands belong to the same prehistoric culture area as Porto Rico, hence stone collars may rightly be expected in them; in fact a fragment of a collar undoubtedly found in St Croix is now in the Nordby collection at Christiansted, the chief city of that island.

As the author intends to point out elsewhere that the localization of characteristic stone objects determines certain archeological areas, he will now only briefly mention the existence of several well-defined prehistoric Antillean culture areas. The majority of stone objects from the St Vincent-Grenada area are radically different from those of St Kitts, and these in turn differ from those of the Barbados area.³ Stone collars, elbow-stones, and three-pointed stones are peculiar to the Porto Rico-Haiti culture area, and when found elsewhere in the West Indies are believed to have been introduced.

¹ Prehistoric Antiquities from the Antilles in the British Museum, *Jour. Roy. Anthr. Inst.*, vol. xxxvii, pp. 402-419, 1907.

² A peculiar form of three-pointed stones from Carriacou, one of the Grenadines, now in the Heye Museum, will be described later.

³ Trinidad and Tobago belong culturally, as well as geographically and biologically, to the adjacent continent.

Since the three types of Antillean stone objects above mentioned are closely connected, both culturally and geographically, they are logically considered as related, and in order to understand the significance of elbow-stones a more accurate knowledge of the collars is desirable.

The variety of forms and the distribution and character of superficial ornamentation of typical Porto Rican collars have been indicated in the author's work, *Aborigines of Porto Rico*,¹ and in the

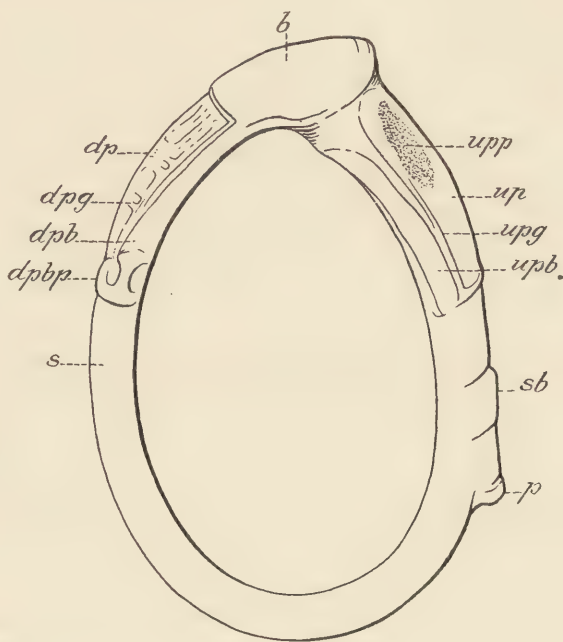


FIG. 116.—Schematic drawing of a slender, oblique stone collar.

accompanying illustration (fig. 116) from that report the topography of the surface ornamentation of one of these collars is indicated. Comparison of an elbow-stone (fig. 117) with a broken stone collar shows that the two have the so-called boss (*b*) and the undecorated panel (*up*) in common. On the other hand, the decorated panel (*dp*), shoulder (*s*), shoulder band (*sb*), and projection (*p*) are not found in elbow-stones. An arm with decoration exists in

¹ *Twenty-fifth Annual Report, Bureau of American Ethnology*, Washington, 1907.

the elbow-stone, but when figures are cut in relief on it they are quite unlike those on the decorated panels of collars. The arms of the two types on which the decorations appear are not identical, and the ends of the two arms of the elbow-stones may be fluted or girt with grooves (*g*), which are not represented in collars.

For convenience of study the two arms of an elbow-stone (fig. 117) may be designated as right and left (*RA*, *LA*), and their point of junction the angle or elbow. One of the arms is either decorated or has a panel; the ends of both may be fluted, while their general form tapers more or less uniformly. One or both arms may have a groove on the outside called the sulcus (*s*), which, when situated on the paneled arm, extends lengthwise from the panel border to the end of the arm. A cross-section of an elbow-stone near the boss following the elbow band¹ is, as a rule, about the same as that near the pointed pole of an ovate slender collar. The surface of an elbow-stone, especially the boss, is generally rough, but several examples have the remaining parts finely polished.

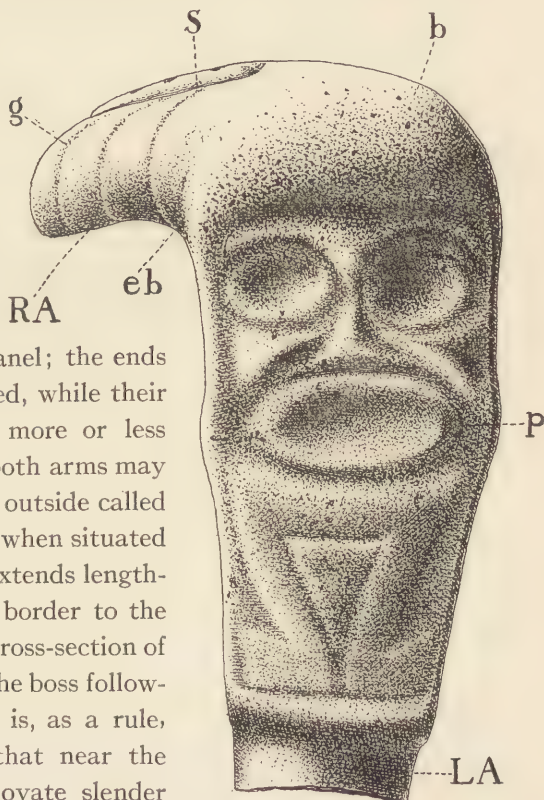


FIG. 117.—Elbow-stone in the Heye Museum. (9×4 inches.)

So close are the general likenesses between the boss and the arms or shoulders of collars and elbow-stones that an identification

¹ The elbow band (*eb*) found in some collars and elbow-stones extends transversely across the inner surface from one rim to the other.

of the latter with broken collars is most natural. In order to explain minor differences in the two types, it is held by some of those who entertain this opinion that a broken collar has been subsequently fashioned into an elbow-stone and its surface redecorated to fit it for secondary use. So radically different, however, are the carvings and symbols on the surfaces of these two types of objects that this conclusion seems unreasonable.

Other archeologists believe that the elbow-stone is a fragment of a type of collar differently ornamented from any that have been found entire. The resemblances are believed by them to be close enough to indicate identity and the differences are looked upon as special rather than as general characters.

The belief that the elbow-stone belongs to a distinct type is far from the thought that there is any utilitarian difference between the two classes of objects. All indications tend to show a like use and that if we could satisfactorily explain the meaning of one type we should be in a fair way to interpret the other. It is, in fact, primarily to shed some light on the significance of the stone collar that the author presents the following results of his comparative studies.

Elbow-stones, like stone collars, may be divided into right-handed and left-handed, or right-armed and left-armed, according to the position of the decorated arm. When an elbow-stone is placed so that the panel will show,¹ this feature will be seen either on the right or the left hand, thus determining the designations "right-handed" and "left-handed" elbow-stones. The significance of the difference in this feature is not known—it may mean nothing, but it would appear that its very occurrence in both collars and elbow-stones has some important bearing on the function of the objects.

The style of ornamentation furnishes data for a classification of elbow-stones on other grounds. Two distinct varieties of these objects can be readily recognized accordingly as a head, face, or

¹ Professor Mason determined this feature by the position of the "projection," which does not exist in elbow-stones. He figured stone collars with their shoulders above and the pointed ends below. The position adopted by the present author as natural for both elbow-stones and stone collars has the pointed pole above.

body is sculptured on the outer surface of one of the arms. This sculpture, when it appears, is generally in low relief, and always

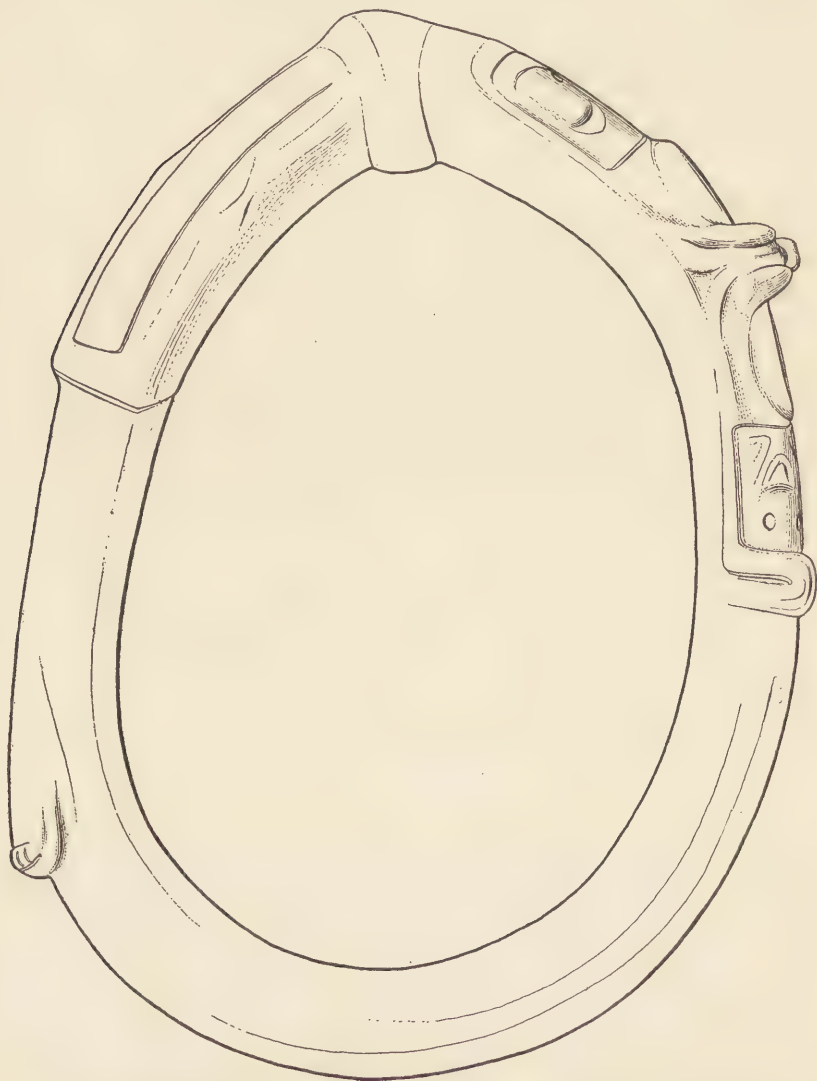


FIG. 118.—Massive stone collar in the Heye Museum. ($20\frac{1}{2} \times 15$ inches.)

represents human features, never those of an animal. In elbow-stones on which such a sculptured figure does not appear, there is

always a panel with a shallow, oval, concave pit hollowed in the middle, in which is sometimes a secondary depression, as shown in figure 125. The arm bearing this panel with its pit corresponds with that on which, in decorated elbow-stones, is cut a human head or body. A homologue of this plain panel (identical with the undecorated panel of a stone collar) does not occur on those elbow-stones in which carved heads or faces are found, consequently it is supposed that the decorated panel of the stone collar is not represented by a sculptured head in elbow-stones.¹

¹ If the arm of an elbow-stone that bears a panel is the same as that with the decorated head, it is not improbable that a head was formerly attached to the panel. Acosta has suggested that a three-pointed stone was attached to the undecorated panel of a stone collar, in which case the resemblance to an elbow-stone with head on the arm would be striking. It is instructive to note that as a rule those elbow-stones that have a figure cut on one arm have, when the arm is unbroken, a sulcus and grooves on the same arm, while those with a panel have the sulcus and grooves on the opposite arms. Few of the specimens have sulci on both arms, a lack which opposes the theory that there was ever a wooden connection, but the best specimens have the end of both arms fluted.

AM. ANTH., N. S., 15-30.



FIG. 119.—Massive stone collar in the Heye Museum. (Side view of Fig. 118.)

In those specimens of elbow-stones in which a face is sculptured on one arm, it will be noticed that the middle line of the face or head is placed longitudinally and not transversely to the axis—always lengthwise of the arm, never crossing it. The position of these figures on known elbow-stones differs radically from that of the heads on panels of stone collars, for in the latter the middle line of the face is at right angles to the panel. The figure on a collar is situated generally on the border of the decorated panel, and is small and in low relief; but in an undescribed collar in the Heye Museum (figs. 118, 119), which is unique in this respect, the head rises above the surface. An examination of this collar shows that in general form it belongs to the massive stone-collar group, while the decoration is more like that of the slender oval collar; but the head cut on the panel is so different from any yet described that it can hardly be assigned to the latter group. It is therefore regarded as a connecting form having affinities with both massive and slender oval collar stones.

It is instructive and may be significant that the faces on all the elbow-stones are anthropoid, and the same is true also of the stone collars, the heads on all of which have human features. The symbolism of the spirit depicted represents a human, not an animal, *zemi*.

DESCRIPTION OF ELBOW-STONES

The following classification includes the known elbow-stones in various collections, designated by the name of the owner, the collector, or the museum in which they are deposited.

A. With face cut in relief on one arm

- a. Face on the right arm*
 - 1. Madrid specimen (fig. 120)
 - 2. Heye Museum specimen (figs. 121, 122)
 - 3. Latimer specimen, National Museum (fig. 123)
- b. Face on the left arm*
 - 1. American Museum specimen
 - 2. American Museum specimen
 - 3. Pinart specimen
 - 4. Heye Museum specimen (fig. 117)

B. Arm without face, but with panel

- a. Panel on the right arm
 - 1. American Museum specimen
 - 2. American Museum specimen
 - 3. American Museum specimen
 - 4. National Museum specimen (fig. 124)
- b. Panel on the left arm
 - 1. Heye Museum specimen (fig. 125)

C. Elbow-stone of doubtful type

A. WITH FACE CUT IN RELIEF ON ONE ARM

a. FACE ON THE RIGHT ARM

1. *Madrid specimen*.—The most perfect and elaborately decorated of all these objects is an elbow-stone in the Museo Arqueologico of Madrid, which has face, arms, and legs sculptured on one arm. This specimen has been figured by Neumann and several other writers, but as it is almost unknown to archeologists a new illustration (fig. 120), indicating the variations in the decoration of these objects, is here introduced.¹

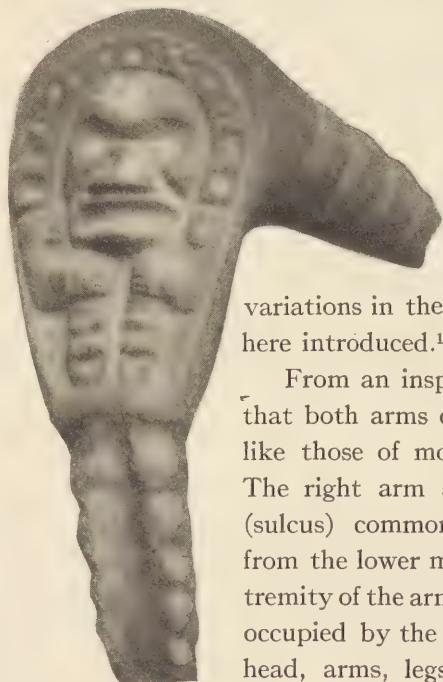


FIG. 120. — Elbow-stone, Madrid specimen. (12 $\frac{5}{8}$ inches.)

From an inspection of the figure it appears that both arms of this beautiful specimen, unlike those of most elbow-stones, are unbroken. The right arm shows the longitudinal groove (sulcus) common to these objects, extending from the lower margin of the panel to the extremity of the arm. The surface is almost wholly occupied by the figure sculptured upon it, the head, arms, legs, and horseshoe-shaped headband or fillet being in relief. This fillet, which

¹ The accompanying figure was made from a photograph obtained in Madrid in 1912 by Professor M. H. Saville. It is a pleasure to acknowledge my indebtedness to him and to my friend Sr Nacisso Sentenach who made the photograph from which the illustration is reproduced.

is of about the same breadth throughout, is decorated with a number of incised pits, one of which is placed medially over the forehead. The fillet ends on each side of the face, near the cheeks, where there are depressions apparently representing ears. This head-band recalls those found on heads of three-pointed stones, with which it is seemingly homologous. The two ends of the fillet merge into the shoulders of the figure and continue to form

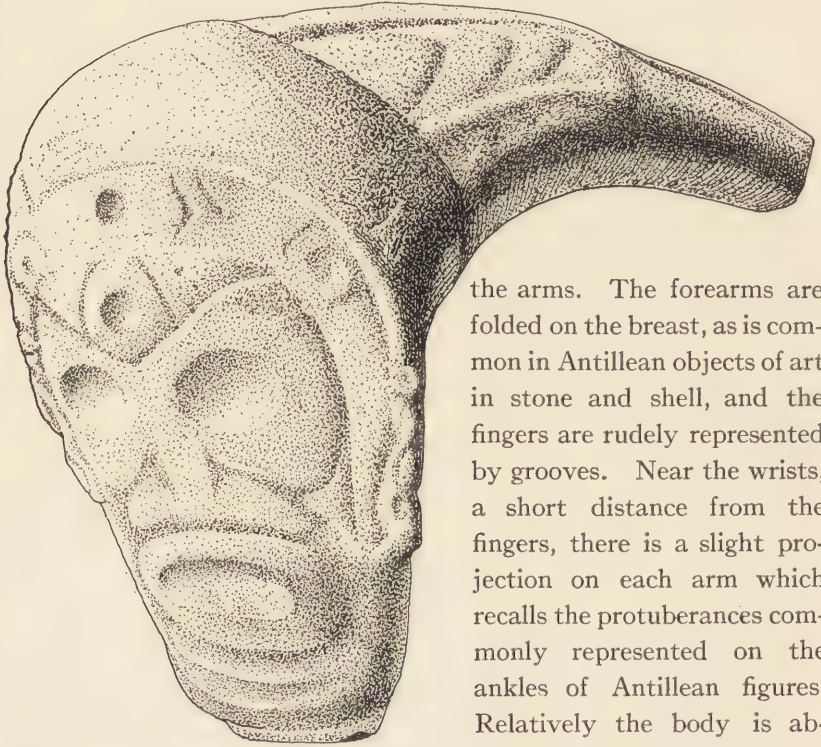


FIG. 121.—Elbow-stone in the Heye Museum.

the arms. The forearms are folded on the breast, as is common in Antillean objects of art in stone and shell, and the fingers are rudely represented by grooves. Near the wrists, a short distance from the fingers, there is a slight projection on each arm which recalls the protuberances commonly represented on the ankles of Antillean figures. Relatively the body is abnormally small or inadequately represented, the space

between chin and legs being so restricted that not even the umbilicus, so constantly found in stone images from Porto Rico, is represented. The soles of the feet are turned upward in an extraordinary way, and the toes are folded back, a common feature in Antillean idols. The mouth is large, nose broad, cheeks prominent, the whole recalling faces on three-pointed stones.

2. *Heye Museum specimen*.—The second specimen of elbow-stone (figs. 121, 122) with a face on the right arm is less elaborately sculptured than the Madrid example, the arms and body not being represented. The right limb is apparently broken off just below the carved face, so that there is nothing on this arm corresponding to a feruled end. On the forehead of the figure may be seen a triangular area in which is a central pit. The head is fringed by a fillet less elaborately made than that of the Madrid specimen. The end of the small arm appears to have been broken, there being no sign of fluting, although it shows indications of a sulcus. On the outer side of the small arm, near the angle, there are two series of parallel lines, or chevrons, cut in the surface, recalling the decoration of a massive collar elsewhere figured.¹

In order to compare this elbow-stone with certain stone heads figured by the author in his *Aborigines of Porto Rico* (pls. LI, LII, LIII) we may suppose that the two arms are much reduced in length, as in plate LII here referred to, and the face cut in high relief instead of being low or flat. A still further reduction in the homologues of the arms appears in certain stone heads

and in stone disks with faces illustrated in the plates mentioned, in some instances all traces of the arms having disappeared. The stone head shown in plate LIV *a a'* has the neck developed into a short handle, giving the appearance of a baton and recalling certain ceremonial celts.² The objects called "stone heads" in



FIG. 122.—Elbow-stone. Sketch of Fig. 121 from the top.

¹ *Aborigines of Porto Rico*, op. cit., pl. LXIV.

² See Joyce, op. cit., and *Twenty-fifth Report Bureau of American Ethnology*, pl. xv.

the author's work above cited so closely resemble three-pointed stones that they may be allied to the third type of zemis, in which the conoid projection is modified into a head. A like parallel occurs in the first type of three-pointed stones, the heads of which recall those of men, lizards, and birds. The few known specimens of the second type have human faces.

The figures representing lizards in both the first and the third type of three-pointed stones are characterized by elongated snouts, eyes, and two pits, representing nostrils, placed near the extremity of the upper lip. The human faces of the first type generally have the ornamented fillet reaching from ear to ear, which is never represented in reptilian three-pointed stones of the first type, but is present in reptile figures in the third type. Ears appear in human but never in bird or reptilian forms. In place of a depression or pit in the median line of the head-band, the reptilian figures of the third type have a device consisting of a low convex projection and pit of the first form. This last-mentioned feature is sometimes situated in a fold extending downward over the forehead, suggesting a frontal ornament.

3. *Latimer specimen*.—This elbow-stone (fig. 123) was first figured by Professor O. T. Mason,¹ who regarded it as a part of a collar,² and afterward by the author, who founded the type now known as elbow-stones upon its characteristics. Although the form of the Latimer elbow-stone is somewhat aberrant in several particulars, it presents the distinctive features of the type. Its arms are apparently unbroken at their extremities, and the face is cut on the right limb. Instead of the encircling grooves on the arm bearing the face, the arm is perforated near its end, where it is crossed by a single transverse groove supposed to serve the same purpose as the grooves in the fluted specimens above considered; in other words, for attachment to a staff or some other object. The oval face, eyes, nose, and mouth are typical of Antillean art. The head-band has a pit medially placed above the forehead and is

¹ The Latimer Collection of Antiquities from Porto Rico in the National Museum at Washington, D. C., *Smithsonian Report for 1876*.

² The Aborigines of Porto Rico and Neighboring Islands, *Twenty-fifth Annual Report, Bureau of American Ethnology*, 1907, pl LXIX.

ornamented by a series of parallel incised lines. The slightly protruding ears at the termini of the head-band have large circular pits. The shorter arm has a shallow longitudinal groove (sulcus?) and obscure elbow-band.



FIG. 123.—Elbow-stone in the Latimer collection. Side and front views. (Length $7\frac{1}{4}$ inches.)

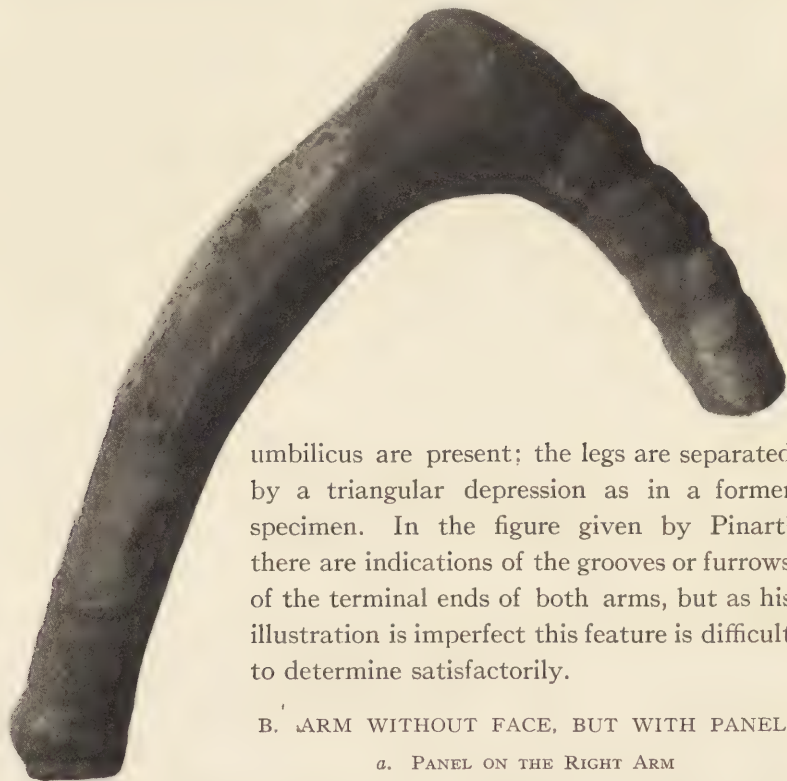
b. FACE ON THE LEFT ARM

1. *American Museum specimen*.—Among the elbow-stones in the American Museum of Natural History there is an instructive specimen in which an arm is ornamented with a human face in relief, portions of the body, and anterior appendages; the legs are drawn together and merge into a beaded end with longitudinal sulcus and accompanying encircling grooves. The face sculptured on this specimen is oval; the cheeks are prominent, the eyes and mouth circular. The ear pits are prominent and the fillet or head-band bears a medial circular protuberance with its accompanying pit. The arms are bent; the legs are separated above by a space in which is a triangular depression. The umbilicus is indicated by a circular design. The shorter arm is girt by parallel grooves and tapers to a rounded extremity.

2. *American Museum specimen*.—In the same Museum there is a second specimen of elbow-stone, on the left arm of which is carved

a rude face. This example is broken on one edge. It has no grooved arms, but in place of them is a perforation near the end of one arm, as in the Latimer specimen. The sulcus is absent.

3. *Pinart specimen*.—The Pinart elbow-stone, said to have been at one time in the Trocadero Museum, Paris, belongs to that group in which the left arm is the larger and bears an oval face which has large open mouth, prominent ears and head-band, with a circular pit over the forehead. Representations of arms, legs, and



umbilicus are present; the legs are separated by a triangular depression as in a former specimen. In the figure given by Pinart¹ there are indications of the grooves or furrows of the terminal ends of both arms, but as his illustration is imperfect this feature is difficult to determine satisfactorily.

B. ARM WITHOUT FACE, BUT WITH PANEL

a. PANEL ON THE RIGHT ARM

FIG. 124.—Elbow-stone in the United States National Museum.

There are five² specimens of elbow-stones with flat panels instead of figures on the arms. Three of these are in the American Museum of Natural History, New York, a single specimen of the same type

¹ *Note sur les pétroglyphes et antiquités des Grandes et Petites Antilles*, pl. 10, 1890.

² Two of these are figured by J. B. Holder in an article, "The Stone Period of the Antilles," *Scribner's Monthly*, August, 1875.

is in the National Museum collection, and there is one in the Heye Museum. All, except the last, are right-handed.

These objects are simpler in form than those of the previous group, otherwise they are of the same general character. Each has a sulcus on the surface of one arm, which, however, is without encircling arm grooves. Although the panel pit, a constant feature of the panel, is about uniform in position, it varies in shape and size in the several specimens. From its general shape and simplicity it would appear that the panel in these specimens served as a base to which another object, possibly a stone head, was attached.

The specimen in the National Museum (fig. 124) is said to have been collected at Vieques island, the only locality excepting Porto Rico from which elbow-stones have been recorded.¹ The paneled arm of this specimen is long and slender, the other limb short and grooved, but with a well-marked sulcus not shown in the figure.

b. PANEL ON THE LEFT ARM

1. *Heye Museum specimen.*—The left-hand elbow-stone (fig. 125) in the Heye Museum is a fine specimen, surpassing the others of the same group in form and superficial polish. Its left arm ends in a series of fluted joints, but is without a sulcus; the right arm is short, with an encircling groove. The panel is almost wholly occu-

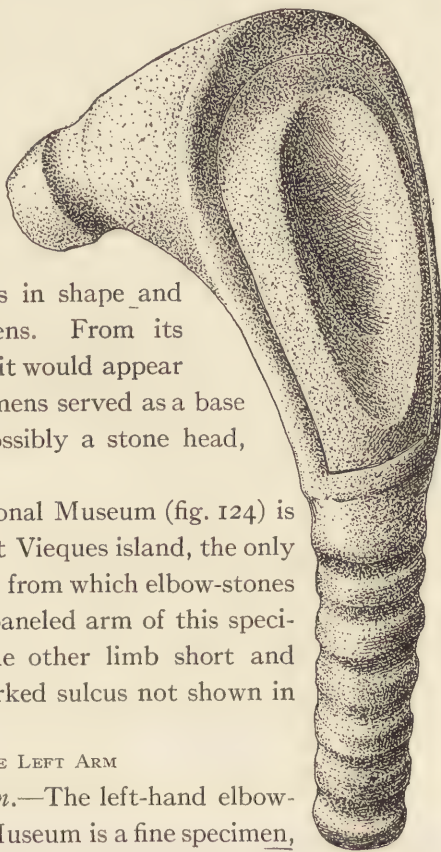


FIG. 125.—Elbow-stone in the Heye Museum.

¹ The Madrid specimen may have come from Santo Domingo. Although Vieques Island had been conquered by the Caribs, like Santa Cruz and St Thomas it belongs to the Porto Rico culture area. The Greater Antilles practically end at Anegada channel, geologically, biologically, and culturally. It will be shown in a later publication that all the islands from this channel to Trinidad had a culture, divided into minor groups, which was largely agricultural (Tainan). This culture, especially in the volcanic islands, had been overlaid by Carib elements.

pied by an elongate oval depression in which is a second oval pit, the surfaces of both of which are smooth. The panel is surrounded by a polished border, slightly raised and evenly rounded.

C. ELBOW-STONE OF DOUBTFUL TYPE

There are one or two aberrant specimens that are doubtfully identified as elbow-stones. In discussing the Guesde collection Professor Mason figured¹ and described an unusual object from Punto Duo (?), allied to elbow-stones but of highly aberrant form, as follows:



FIG. 126.—Two views of an aberrant elbow-stone in the Guesde collection of the Museum für Völkerkunde, from a drawing made in 1913. (One-third size.)

Fig. 195. An ornamental piece, of bluish green color. It is rare in form but not absolutely unique. In the American Museum at New York is a similar specimen. The chamfering and fluting are gracefully blended. The left-hand extremity is perforated for suspension. Length of long limb, 8 inches; of short limb, $5\frac{3}{10}$ inches.

The differences between this specimen (fig. 126) and the typical elbow-stones lie mainly in the "chamfering," nevertheless it shows certain characters peculiar to elbow-stones. The "similar specimen" in the American Museum, referred to by Mason, is possibly one of those above mentioned under group B.

The Guesde stone is exceptional in several particulars. The figure shows no indication of a panel or a head, and the sulcus like-

¹ Guesde Collection of Antiquities in Pointe-à-Pitre, Guadeloupe, West Indies, *Smithsonian Report for 1884*, reprint 1899.

wise is missing. On account of the absence of the panel it is difficult to tell whether it belongs to the right-arm or the left-arm group. The fluting on the longer arm reminds one of the specimen in the National Museum at Washington (fig. 124), and the perforated shorter arm is like that of the Latimer specimen (fig. 123). The grooves of the smaller arm extend halfway round the arm, while those of the longer arm girt it entirely.

MORPHOLOGY AND INTERPRETATION

The many similarities between three-pointed zemis, elbow-stones, and stone collars would seem to indicate a corresponding similarity in use, consequently any light on the morphology of one would aid in the interpretation of the other types.¹ The author believes that the life figures on these three types of objects are symbolic representations of zemis, or spirits, which were worshiped by the prehistoric Porto Ricans. They were idols, and bore the name of the particular spirit represented (as well as the general designation "zemi"), a usage common to primitive religions.

A consideration of the differences in form, or the morphology, of these objects is desirable before the many theories as to their use can be intelligently discussed.

A forward step in the interpretation of the morphology of stone collars was taken by Mr Josiah Cato² and later by Professor Mason who recognized that the "shoulder ridge" faintly resembles a lashing of the two ends of a hoop.³

An important suggestion has been made by Mr T. A. Joyce⁴

¹ A discussion of the many theories suggested to explain the meaning and use of stone collars would enlarge this article to undue proportions, hence the question will be considered elsewhere. In the following pages one of these uses is incidentally considered.

² Dr Holder (The Stone Period of the Antilles, *Scribner's Monthly*, August, 1875) quotes Mr J. Cato (1869) as follows: "The other [region of collar] on the side of the ellipse, may, perhaps, be intended to represent the ends of a hoop which have been laid together and bound by a ligature."

³ The most serious objection to the majority of theories of the use of Porto Rican stone collars is that they fail to explain a constant feature, the "shoulder band and projection." These features appear in most collars of both the massive and the slender oval varieties.

⁴ Prehistoric Antiquities from the Antilles, in the British Museum, *Jour. Royal Anthr. Institute*, vol. XXXVII, pp. 402-419, pl. XLVIII-LVI, 1907.

that the Antillean stone collar is a copy of an archaic zemi made of branches of a tree bent into a hoop and fastened at their ends. He was the first to associate the stone collar with "tree worship," an important advance in the solution of the enigma. Mr Joyce described a stone collar in the British Museum in which there is no shoulder ridge but what appear to be the two ends of branches "overlapped" and "hooked together" at the point where the shoulder ridge ordinarily is found. This led him to suggest that in studying a stone collar we must "retranslate" it to its wooden prototype and recognize that the juncture of the ends in this case (and perhaps in all) was effected as follows: "When the limbs of the fork [of a tree] were trimmed, the stump of a small subsidiary branch, growing in a convenient position towards the end of each, was left projecting; the longer limb was bent round, and the projection towards its termination was hooked round the projection on the shorter limb; the addition of a cotton bandage would hide the joint and make all secure." (P. 410.)

"It is perfectly obvious," Mr Joyce says, "that these collars were constructed originally of wood; a young tree was selected and cut off immediately below a fork; the two ends of the fork were trimmed into unequal lengths, the longer bent round so as to overlap the shorter, and the two fastened together by a band of cotton similar to the leg-bandages worn by the natives." He also states (p. 410): "Starting with the supposition that they were originally constructed of wood (which seems to me to be almost certain), it seems possible that a clue might be found in the prevalence of tree-worship in the Antilles."¹

"The heavy collars," continues Mr Joyce, "which appear to have been formed of a single and comparatively stout stem bent into a hoop and the ends secured by a bandage, may represent zemi made originally from the straight trunk of a tree without a fork." Thus a second and important step in the interpretation of the meaning of the collar was taken by Joyce in the recognition of the collar as a zemi connected with tree worship, its original prototype

¹ In a future publication an effort will be made by the present writer to identify the spirit of the tree or bush represented by the images on elbow-stones, three-pointed stones, and stone collars.

being made of wood, the stone form being a more lasting one, but one in which certain characters of the wooden or archaic form still persisted.

In Ramon Pane's account of how Antillean wooden zemis were made, as directed by a tree spirit, we have evidence of tree worship in Haiti, but the testimony afforded by this account is too meager to prove that when the tree referred to by the Catalan father was felled it was made into the form of a collar. The author suspects that the idol referred to by Ramon Pane represented the Yuca Spirit, but this suspicion is still subject to proof.

In Antillean as in other tree worship it was the spirit of the tree that was the object of adoration, and that worship was more or less connected with the material benefits desired: generally the food that the tree yielded. The deity that controlled the manioc (*yuca*), or the Yuca Spirit, *Yucayu*, was worshiped for temporal benefits, the wooden idol being the visible, material symbol.¹

In differentiating the elbow-stone from the collar as a distinct type, it has been shown above that the position of the heads of both relative to the axis does not coincide, since one is transverse to the axis, the other longitudinal. In one case the object must be placed vertically, in the other horizontally, in order to bring the face into a normal position—a difference in position that remains to be satisfactorily explained. If, however, the elbow-stone was carried, it may be that one arm only of the elbow-stone was attached to a staff and the object carried upright, while the collar was laid horizontally when in use, bringing the head² into the same relative position.

It is evident that the furrow, or sulcus (*s*), is an important feature in the morphology of elbow-stones. This groove, non-existent in the collars, may have been cut in the surface of the elbow-

¹ Attention is called to the fact that as yet no collar, elbow, or three-pointed idol made of *wood* has been found, although several wooden ceremonial objects have been recorded from caves in Haiti, Jamaica, and the Bahamas. The discovery of a wooden collar would serve as a most valuable and decisive support of Mr Joyce's suggestion.

² The two known collars besides that shown in figures 118 and 119 with heads cut on the decorated panel border have these faces in the same relative position as that shown in the figures cited, while in all elbow-stones they are at right angles and resemble figure 117 in this particular.

stone for the insertion of a rod or staff to which it may have been lashed with cords held in place by the grooves girdling the arm. It is not always limited to one arm, but is sometimes found on both arms, and it would appear that occasionally either two sticks were attached to the stone, one at each end, or the two ends of the same stick were bound to the arms, in which latter case the stick would have to be bent into a hoop resembling in shape a stone collar, part wood, part stone, the elbow being of the latter material.

The attachment of an elbow-stone to a rod or staff was probably by means of vegetal fibers; in some instances this was unnecessary, since there was sometimes a depression in the end of each arm, as in an elbow-stone reputed to be owned by Sr Balbas of Porto Rico, to which reference has been made elsewhere, but which the author has not examined. In this case it appears as if there are depressions in which the sticks were possibly inserted, rather than lashed to the stone.

The theory that the extremity of a staff was laid in the sulcus and lashed to the elbow-stone would preserve the normal position of the face carved on the panel if held vertically. If carried by means of this staff, the face cut on the arm would be upright or in a natural position. Some of the elbow-stones (fig. 127) may have been carried in the hand without an attached staff, thus accounting for the absence of a sulcus.

The close resemblance of the faces on the elbow-stones to those on three-pointed *zemis* has already been mentioned. There are other likenesses between these objects, for it sometimes happens that the anterior and posterior ends of three-pointed stones are so elongated that their length equals the arms of an elbow-stone. (See fig. 127.) These resemblances may signify that the three-pointed stone is morphologically related to the elbow-stone.

Three-pointed stones, as other writers have shown, generally, but not always, bear surface evidences of worn grooves indicating a former attachment by cords or bands. Especially are these evident in three-pointed stones belonging to the first and second types, where a ridge is often found back of a groove at the base of the conoid apex. The wear of the lashing by which it was tied

can sometimes be observed in this groove, where the stone is quite smooth. The general likeness of the three-pointed stones and the elbow-stones leads one to compare the so-called anterior or head end of the former to the arm of the latter on which the head is cut, while the posterior end would represent the other arm of the elbow-stone. In this comparison the conical region of the three-pointed stone would be homologous to the elbow. Following out this comparison we can suppose the three-pointed stone was attached to a staff in much the same way that the elbow-stone is theoretically supposed to have been lashed, as above set forth.¹

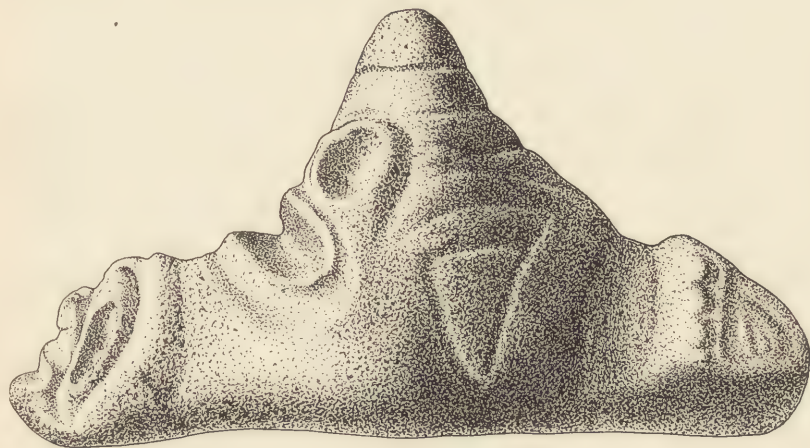


FIG. 127.—Aberrant form of elbow-stone in the Heye Museum. (Length 8 inches.)

The classification of three-pointed stones indicated in the author's *Aborigines of Porto Rico*, where like forms of these objects are grouped into types, is more or less arbitrary, but it is believed to be a convenient one for scientific comparison. Additional specimens of three-pointed stones, unknown when the classification was suggested, have since come to light, and it is found that a few of these forms are aberrant and do not fall naturally into any one of the four divisions suggested. One of these (fig. 127), in the Heye

¹ Among Guiana Indians, according to im Thurn, "the Ackawoi have one dance in which each of the performers represents a different animal; and in this each carries a stick on which is a figure of that animal" (*Among the Indians of Guiana*, p. 324, 1883). The prototype of the stone zemi among the Antilles was like that of wood among the Orinoco tribes.

Museum, has the three-pointed form, but with the distinctive sculptural features of both the first and second types; that is, this specimen has a head cut on the anterior end and another head or face on the side of the conoid projection just above it, and therefore has distinctive features of both the first and the second type. The specimen referred to is exceptional in other features. While its general form, as seen from one side in the accompanying figure, shows profiles of the two faces and also the superficial sculpturing on one side of the conoid projection, the posterior end, as in the first type of three-pointed stone, has representations of retracted legs,¹ a feature foreign to most known and all described specimens of three-pointed stones of the second type. The lateral and real surfaces of the conoid projection are ornamented with an incised groove which, strangely enough, extends to the region of the ears, where it ends in a triangular figure forming an appendage quite unlike the ear of any known Antillean idol. There are several other three-pointed stones in which the conoid process is ornamented with incised lines, and one other in which the lines are rectilinear; but they are generally curved lines—spirals, circles, and the like. Straight lines with sharp angles are rarely found on three-pointed stones.

CEREMONIAL BATONS OF STONE

An examination of certain celts, clubs, and other stone artifacts leads to the belief that the prehistoric Antilleans had many kinds of objects which they carried in their hands on ceremonial or other occasions. Several of the almond-shaped or petaloid celts with heads or human figures cut on the sides have their pointed ends prolonged into a handle;² and even those without such a prolongation can hardly be supposed to have been hafted, as in such a case much of the design cut upon them would have been concealed. Many of the beautiful axes for which the island of St Vincent is famous were too bulky to be carried in war and too dull to be used

¹ The author has lately acquired, through the courtesy of Professor Saville, a photograph of a three-pointed zemi with a head on the posterior as well as on the anterior end, a condition unique in the many known specimens of the first type.

² See Joyce, *op. cit.*

as cutting implements. They may have been carried by chiefs on ceremonial occasions as badges or insignia of office.¹

A remarkable stone object (fig. 128) in the Heye collection has the appearance of having been used as a baton, but its form² is differ-

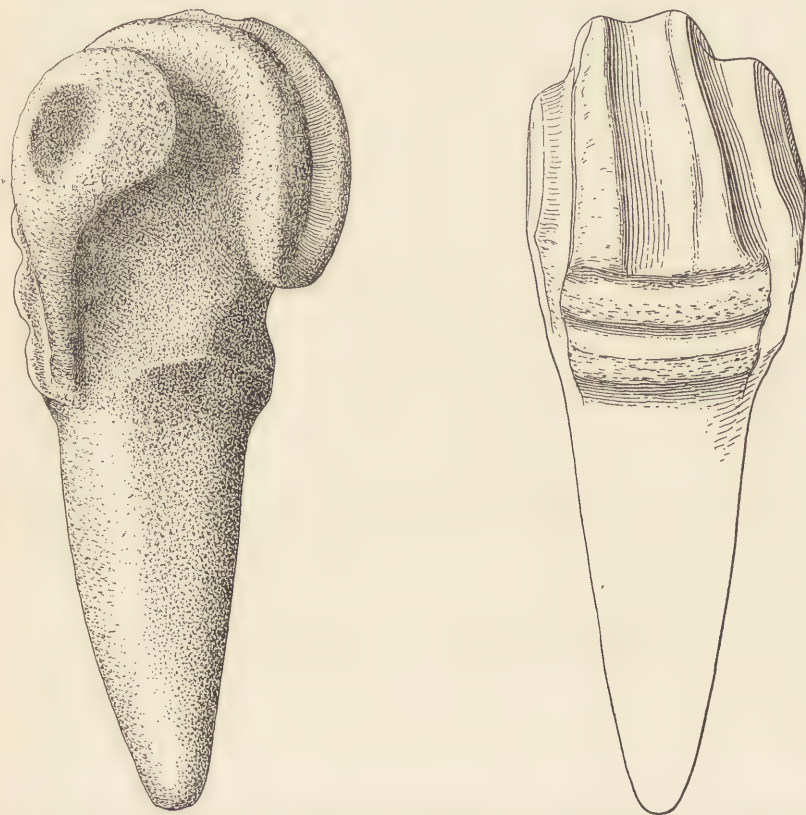


FIG. 128.—Two views of a stone ceremonial baton in the Heye Museum. (Length $6\frac{1}{2}$ inches.)

ent from that of any yet described, and would suggest that it was carried in the hand, but it may have been inserted into a wooden

¹ The "figure trouvée dans une sépulture indienne," figured by Charlevoix (*Histoire de l'Isle Espagnole ou de St. Domingue*, p. 6), is believed to be a ceremonial baton similar in function to the object here considered.

² Many different forms of batons made of stone, wood, and even clay, might be enumerated. A wooden stick with an animal, or rather two animals, carved on the end is figured in the author's *Aborigines of Porto Rico*.

staff. One end of this object is enlarged, with the surface cut into a definite form, while the other end tapers uniformly, providing the handle, possibly for attachment to a rod. The figure on the larger end has a median crest or ridge extending over the extremity, on each side of which is a prominence, the arrangement recalling the crest and eyes of some highly conventionalized animal. The crest or ridge is found on examination to be double and to extend



FIG. 129.—Two views of a stone ceremonial baton in the Museum für Völkerkunde, Berlin. (About one-third size.)

round the larger end, the two parts coalescing at one end and uniting by a transverse band on the other. On the sides of this median crest are the protuberances, each with a circular pit and extension from the margin. The only object known to the writer that approaches in form the stone referred to is one made of burnt clay found in Barbados, many miles away. This specimen¹ also has an

¹ Now in the Cornell collection at St Kitts, British West Indies.

enlargement representing a head at one end and tapers uniformly to the other extremity in the form of a handle. The Barbados object also has a crest extending along the middle of the enlarged part and ending abruptly near a hole which may be likened to a mouth; on each side of this elevation there are pits that may be regarded as eyes. The ridge or crest suggests a distorted nose, or the beak of a bird, a suggestion that would seem to comport with the parts on the enlarged end of the stone baton above described. The double median fold and lateral elevations with pits represent beak and eyes.

Another stone object, from an unknown locality, described by Professor Mason, evidently belongs to the same type as the stone ceremonial baton, or some form of badge mounted on a staff. Mason's description of this object is as follows:

Fig. 197. An ornamented stone of a marble gray color. The right part is conoidal and has near its middle a raised band. This may have fitted a socket. The left part resembles a liberty cap, bounded at its base by a curve of beauty. On the two sides of the enlarged middle are compound scrolls in relief, resembling the implements sold to draughtsmen for making curves. Length $11\frac{1}{2}$ inches. The accompanying illustration (fig. 129) is from a drawing of this object in the Guesde collection in the Museum für Völkerkunde in Berlin.

USE OF ELBOW-STONES

The author believes that stone collars and elbow-stones were used for similar ceremonial purposes. They are regarded as idols (*zemis*), and the figures sculptured upon them are supposed to represent spirits (*zemis*). The arms of elbow-stones are interpreted as extensions by which these idols were attached to a foreign body, and are regarded morphologically as rudiments, survivals of more elaborate objects, possibly the same as the shoulders of stone collars. It is believed that the spirit represented by the faces on the elbow-stones is a bark or tree spirit, and that possibly it is the being that caused the manioc, a plant of prime importance to the ancient Antilleans, to germinate and increase. This spirit the Antilleans of Porto Rico and Haiti called *Yucayu*.



NOTE ON THE ARCHEOLOGY OF CHIRIQUI

BY GEORGE GRANT MACCURDY

THE faunal environment of a given region is apt to be reflected in its primitive art, especially when the art is primarily of local origin. The province of Chiriqui, Republic of Panamá, affords a good example of this interrelation. Archeologically the most common medium of art expression is pottery. The principal motives in the ceramic art of Chiriqui have been traced to certain animal forms. For example, the armadillo and motives derived from that animal, or parts thereof, are so dominant in one large class of pottery as to justify the name *armadillo* ware for that par-



FIG. 149.—The octopus design as a panel decoration. Lost color ware. Heye collection, cat. 3311. ($\frac{3}{4}$)

ticular ceramic group. For a like reason other groups are appropriately called *serpent* ware, *fish* ware, and *alligator* ware. Very few motives can be traced to plant originals.

Recently Professor Marshall H. Saville of Columbia University called my attention to the decoration of an ancient vase collected by Mr George G. Heye while in Chiriqui during the month of January, 1913. The vase (fig. 149), which is in a perfect state of preservation, belongs to the so-called lost-color ware. The chief ornamental feature is enclosed in a large circular panel on the side of the vase and repeated on the opposite side. It consists of a diamond-shaped body and eight extremities somewhat evenly distributed, and all curved at the distal end as if to suggest a prehensile or clinging character. In drawing some of these appendages the artist apparently misjudged the space at his disposal or else purposely made some of the appendages smaller than others. All are composed of similar elements. The five larger, however, are made up of three parallel bands; while in each of the other three space enough was left for only two parallel bands. The original was evidently an animal form without apparent head or tail or even antennæ, but with exactly eight appendages that are also relatively large in comparison with the size of the body. Moreover, alternating with the two circular panels are two rather narrow vertical panels, in which motives (similar to fig. 150) are repeated that are derived from the same animal form. When showing me this vase Professor Saville suggested, and it seems to me with reason, that the octopus is here represented. It might also represent a cuttlefish of the octopod type. Both are known to exist in Isthmian waters and by their nature would be calculated to leave an indelible impression on the primitive mind.

Had Mr Heye's splendid specimen been a part of the United States National Museum collection when Holmes wrote his *Ancient Art of the Province of Chiriqui*,¹ or of the Yale collection when I was preparing *A Study of Chiriquian Antiquities*,² it would have suggested to him or to me the meaning of certain puzzling motives encountered at the time—puzzling because of the absence of the realistic stages in their evolution. For example, figure 150 (Holmes' fig. 271) was considered by him to be a "highly conventionalized

¹ *Sixth Ann. Rep. Bur. American Ethnology*, Washington, 1888.

² *Memoirs Conn. Acad. Arts and Sciences*, vol. III, Yale University Press, 1911.

alligator derivative." That it is, however, derived from the same original as the design on the Heye vase is now quite apparent. The



FIG. 150.—The octopus motive. (After Holmes.)

same is true of figure 151 (Holmes' fig. 275), a very interesting example of the use of the octopus appendages to form a pleasing running ornament independently of the body of the animal. Figure 152

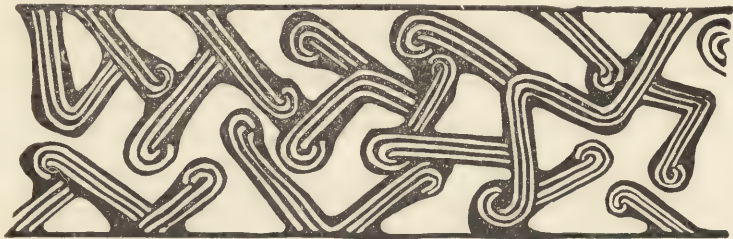


FIG. 151.—The octopus appendage repeated to form a decorative motive. (After Holmes.)

(Holmes' fig. 238), a detail from a drum-shaped vase of the lost-color ware, is a variation of the same thing.

In the light of the foregoing, geometric designs like that in figure



FIG. 152.—Conventional design on drum. (After Holmes.)

153, from the shoulder of a bottle-shaped lost-color vase (Holmes' fig. 272), take on a new meaning. The rosette-like designs filling circular panels on numerous small lost-color vases figured by both

Holmes and myself, are likewise probably traceable to an octopus-cuttlefish original. An example from my own work (fig. 194) is reproduced in figure 154. The row of spots following the convexity



FIG. 153.—Octopus derivative. (After Holmes.)

of the four curving arms are properly placed to represent the suckers of the octopus appendage.

The vase reproduced in figure 155 (pl. XLII, fig. *a*, of my monograph) is worthy of a detailed description. All the original ground is red with the exception of the peripheral band and those tangent to the neck, which are white. They were painted on first; then the bottom and the upper panels were colored red; finally came the waxing process and the coat of black, which was eventually removed from the design by melting the wax. This specimen is from Divala, and is not only beautifully modeled and painted, but also one of the best preserved of the entire group. The outline is softly angular, due to the sloping shoulders and slightly pointed bottom. The equatorial band cuts the body into two almost identical halves, the upper being surmounted by a narrow neck and projecting but well-formed lip. The framework of bands is a thick white paste that has received a high polish. The red field encroaches somewhat on the margins of the bands, and the black, the last to be applied, narrows them still more. The lower half of the vessel is in two zones, the nether of red and the upper of black, with groups of narrow longitudinal bands. The neck and lip are also banded. Of the four panels surrounding the neck, the vertical ones are decorated with triangles.



FIG. 154.—Lost color vase with octopus motive as a panel decoration, Yale collection. ($\frac{2}{3}$)

The design in the arched panels, alike on both sides, I said at

the time (page 112) "May or may not be construed as a life form. The diamond-shaped center may represent the body, and the six appendages, the head, tail, and legs. These are all composed of the same elements—a short straight band accompanied by two longer curving parallel bands. The four short appendages are attached to the center of the four sides of the square; the two long ones, at opposite corners. The whole is a piece of decorative work admir-



FIG. 155.— Beautifully modeled lost color vase with octopus design as a panel ornament. Yale collection. ($\frac{3}{8}$)

ably conceived and adapted to the space at the artist's disposal. The design may have no significance other than this." It now appears that this is also the octopus design with exaggerated body and appendages relatively small and reduced in number.

Figure 156 is another example from my volume already cited (fig. 199). A frondlike motive, apparently derived from the octopus appendage, is repeated over and over again. A median point on the bottom is the center. Through it pass four slender vertical parallel bands reaching from a position half-way between the handles on one side to a like position on the opposite side. Beginning at the

bottom and ascending on each side to the neck are successive pairs of opposite fronds. Each frond consists of three slender parallel bands rather sharply curved at the tips, with a single row of spots adjacent and parallel to the longer upper band; these follow the convex margin of each appendage as they do in figure 154. In some cases this row of dots is carried up the stem to the base of the succeeding frond. In the large



FIG. 156.—Lost color vase ornamented with octopus motives. Yale collection. ($\frac{1}{2}$)

field below the base of each handle there is a design with a diamond-shaped center and six frondlike appendages, recalling the design in the arched panels of the vase reproduced in figure 155.

Still further removed from the octopus original is the design on the vase reproduced in figure 157 (fig. 181 of my work previously cited). This vase had seen much service, the recurved lip having dis-

appeared piecemeal. The broken surfaces are aged and smoked, and the tone of the entire red ground is deepened. On opposite sides of the body are life forms in low relief. Alternating with these are two four-sided panels, each filled by a painted design that I once said "retains only slight traces of a life form." It now appears to me like eight (the correct number) octopus appendages so disposed as to form a pleasing decorative motive. On the opposite side the combination of these same elements is such as to produce an equally original though somewhat different design.

It is worthy of notice that designs derived from the octopus are confined to one great group of Chiriquian pottery—the so-called lost-color ware. This is in keeping with what was found to be the case with other animal motives. The armadillo dominated one group, the serpent another, the fish a third, and the alligator two closely related groups. Again, a given technique prevails in

each group. In the armadillo and the fish ware the designs are in the round or in relief; in the serpent ware the motives are incised and incisions filled with a white substance; in the alligator and the polychrome ware, the alligator motives are in color; and this we now find to be likewise true of octopus motives.

I realize that decorative and symbolic art is not to be demonstrated by mathematical formulæ. That its manifestations are, however, subject to laws of growth, and one might add decay, there can be little doubt. In the evolution of art the haphazard plays an insignificant rôle. The reasons for each step may not always be obvious, but they exist nevertheless. The work of a given



FIG. 157.—The octopus appendage repeated eight times to form an ornamental pattern. Lost color ware. Yale collection. ($\frac{3}{5}$)

artist reflects alike his spiritual makeup and his environment, cultural as well as natural. Without insisting that the model for the design in figure 149 is an octopus, one is certainly justified in affirming a genetic relationship between that design and those in the subsequent figures (especially 150, 154, 155, 156, and 157). Their kinship therefore has a more solid basis than mere fortuitous convergence toward a common type. Each artist either had in mind the common source of inspiration or else copied from some one who was drawing from that original source.

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PETROGLYPHS OF ST VINCENT, BRITISH WEST INDIES

PETROGLYPHS OF ST VINCENT, BRITISH WEST INDIES

BY THOMAS HUCKERBY

THE island of St Vincent was discovered on the 22d day of January, 1498. This being, according to the Spanish calendar, the day of St Vincent, the island was named in his honor. At that time it was inhabited by a large number of Indians. Dr Coke states that there were two distinct tribes, Red and Black Caribs.¹ There are many evidences of long prehistoric occupancy, of which the petroglyphs are among the most important.

Speaking of the West Indies, Dr J. Walter Fewkes states² that "not the least significant of the many survivals of a prehistoric race in the West Indies are rude pictures, cut in the rocks and called 'pictographs' or 'petroglyphs.' A study of their forms, geographical distribution, and meaning is an important aid to our knowledge of the origin and development of Antillean culture: it affords valuable data bearing on the migration of the race and points the way back to its ancestral continental home." The above statements do not too strongly set forth the position in relation to this important subject. Tribe may have succeeded tribe in the occupancy of these islands, but the petroglyphs have remained in the same position as they were when first chiseled by the prehistoric artist. Such is not necessarily the case, however, with the stone implements, earthenware utensils, and other artifacts which are constantly coming to hand, since it is certain that many of these were brought by the various tribes when they migrated to these islands from their original homes.

The full significance of the West Indian rock-carvings cannot be realized until all the examples known to exist in the various islands have been carefully photographed and compared with the examples found on the mainland. As a preliminary contribution toward the accomplishment of this desirable object, this short

¹ T. Coke, *History of the West Indies*.

² *Annual Report of Bureau of American Ethnology*, 1903-04.



A. PETROGLYPH, DEEPLY INCISED; BARROUALLIE, ST VINCENT



B. BOWLDER, DEEPLY INCISED; BARROUALLIE, ST VINCENT



article is written. At the present time we propose to deal exclusively with the petroglyphs of St Vincent. On some future occasion, should the opportunity be presented, we hope to be able to consider the other sections of this field. Probably there is not an island of greater interest than St Vincent to the student of the rock-carvings of the Antilles. It also may be said that throughout the West Indian archipelago there is nothing of greater archeological importance than the St Vincent petroglyphs.

For the purpose of the present article the petroglyphs now being considered may be classified under three heads: (1) Deeply incised, (2) shallow, and (3) cave. This classification is followed herein when individual examples are discussed.

The process by which the distinct types of petroglyphs were made must have been somewhat different. In all probability examples of the first and third classes were produced by means of a primitive chisel; the outlines of the shallow type may have been first scratched out and then finished by friction.¹ Im Thurn states that in British Guiana the deeply incised and shallow engravings are never found in the same district. In St Vincent, the areas in which they are found are separated by only a few miles. Nevertheless it is quite possible that they represent different periods and cultures.

Our notes may incidentally throw some light on the debatable question of the antiquity of the aboriginal occupancy of St Vincent. It is an accepted fact that Indians occupied this island under settled conditions long before the coming of Columbus. But how long? This is a question for which it seems impossible to find a definite answer. Judging from the appearance of the rock-engravings and the fact that the older figures had probably become effaced by the time the later incisions were made, it would seem that man found a home in this island much farther back in prehistoric times than is often supposed. Unfortunately it is not possible to estimate, with any degree of precision, how long a period would be required for the petroglyphs to have become obliterated by natural processes. It is probable that occupancy of the island gradually developed from occasional visits to settled and permanent residence.

¹ Everard F. im Thurn, *Among the Indians of Guiana*.

Another question of importance to the thoughtful student is, What tribe was responsible for these art remains? Generally it has been assumed that the petroglyphs date from the period of the Carib occupancy, but this theory should not be given undue weight. At the time of the discovery, the Carib women spoke a different language from that of the men, from which fact it has been conjectured that the males of the community represented the intruders, and the females the original inhabitants of the island, the supposition being that the Caribs had defeated the aborigines, exterminated the men, and taken the women as their wives. To account for the persistence of the two languages it has been said that the females were the slaves of the males and that there was very little actual association between the two. All this may be true, but it would not satisfactorily explain the existence of this condition over a long period. In process of time, and that not very prolonged, were the theory above mentioned tenable, the women would inevitably adopt the speech of the men. Hence it follows that the Carib invasion must have taken place not very long before the time of the discovery; and taking this fact into consideration, together with the almost certain antiquity of most of the petroglyphs, it seems unlikely that all the examples are the work of the Caribs. There may have been several prehistoric tribal migrations from various parts of the mainland. The large number of petroglyphs of one class suggests that the occupancy previous to the incoming of the Caribs extended over a considerable period. It is probable that most of the Antillean islands were peopled by one tribe before the Carib conquest, and the deeply incised figures may have been produced by them. The Petit Bordel petroglyph is the only one of the shallow type. We are of the opinion that this represents a much later period than the petroglyphs of the deeply incised class. If it is possible to ascribe any of the rock-carvings to the Caribs, it can reasonably be done in this case.

What these pictographs originally signified it would be impossible to say. We cannot imagine that they were produced simply to while away the time. The recurrence of particular figures (see the notes on Buccament Cave) indicates a definite intention. Prob-



A. PETROGLYPH, DEEPLY INCISED; RUTLAND VALE, ST VINCENT



B. PETROGLYPH, DEEPLY INCISED; INDIAN FOINT, ST VINCENT



ably some of the petroglyphs had a religious significance. In every part of the world, at some time or other, one of the most common objects of worship has been a block of stone. In St Vincent it is a very common belief that such stones were used as sacrificial altars. This is not impossible. It is a well attested fact that the Indians of the time of the discovery were cannibals. When Columbus discovered Guadeloupe he found the huts of the natives strewn with human limbs and heads. Some of the petroglyphs may be crude attempts to depict the forms of dead chiefs whose spirits were worshipped and whose anger was appeased by the oblation of the blood of human sacrifice. Probably these were regarded as intermediary spirits through which they approached the supreme deities. All the petroglyphs may indicate centers of religious worship.

While many of the rock-carvings of St Vincent are of the deeply incised type, they do not show much resemblance except in the case of a few conventional heads. There is some similarity in type between the central figure of the one at Rutland Vale, Layou, and the larger engraving of the Indian Point petroglyph. The large figure of Yambou Pass Rock (fig. 77), so far as depth of incision is concerned, comes between the deeply incised type and the shallow engraving of Petit Bordel. With the exception of engravings of the Buccament Cave, they have all been incised in hard volcanic rock.

It is worthy of note that all the petroglyphs in St Vincent are found near the old sites of villages. We believe it to be a mere coincidence that many of them are found near rivers. Aboriginal man would naturally establish his home in close proximity to a supply of fresh water; and assuming that the petroglyphs indicate positions of importance, they would probably not have been placed far from the scene of his everyday life.

The petroglyphs of the first and third classes above mentioned are of the same type as those found in the other Antillean islands, and indicate the same culture, while the Petit Bordel petroglyph and the figures of the Buccament Cave point to a connection with the culture of the mainland. The Mexican culture, however, does not appear to have had any influence.

In conclusion we may say that in preparing the photographs from which the accompanying illustrations are prepared every effort has been made to give reliable representations of the actual petroglyphs. Where any doubt exists, it has been stated in the notes on the particular petroglyph under discussion.

DESCRIPTION OF PLATES

PLATE XXV, *a*.—This engraved rock is found in the middle of the Glebe field and is situated about 200 yards to the left of the highway from Barrouallie to Kingstown. The slope of the boulder faces westward. The incisions have a depth averaging about a quarter of an inch. Particular attention is called to the halo of thirteen rays. This figure may indicate a solar symbol. The basin-like depression immediately below the bottom of the engraving seems to be a natural formation.

PLATE XXV, *b*.—This rock lies about 300 yards from the petroglyph shown in Plate XXV, *a*. The hollow of the top seems to have been made by pounding, and the incisions used to sharpen pointed implements.

PLATE XXVI, *a*.—This petroglyph is known to the natives of the island as "Jumbi Rock", or "Marked Stone", and is sometimes called the "Sacrificial Stone". It is situated about a mile up the Rutland Vale valley. The side of the stone on which the figures are seen has a southerly aspect. A very old man living in the valley probably correctly states that he remembers the time when the engraved surface was in a horizontal position. It will be seen from the illustration that the river washes the base of the stone. It may be that, some time in the past, the river slightly changed its course at this point and that what was originally the foundation of the southern side of this large rock was washed away. The oblique eyes of the central figure are unique. The cup-shaped cavities at the top of the lines, leading down to the two faces on the left, are considerably deeper than the parts of the engraving. There are indications of older figures on the face of the rock. A burial urn containing a skull and surrounded with other bones was discovered by the writer in this valley. A drawing of this engraved boulder has been published by Karl Sapper in his paper on St Vincent, *Globus*, Bd. LXXXIV, Heft 24, Abb. 8, Dec. 24, 1903.

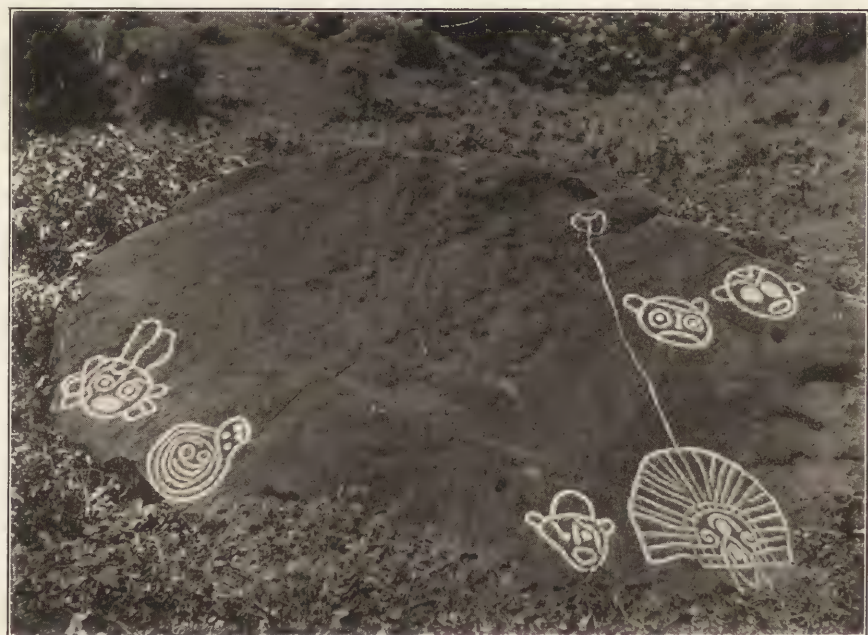
PLATE XXVI, *b*.—This petroglyph is on the extreme point which lies between Indian bay and Villa bay. The rock faces south. The position of an uncertain line is indicated by the dots seen to the left of the engraving.

PLATE XXVII, *a*.—This is the most recently discovered petroglyph in the island. It lies to the right of the highway from Kingstown to Lodge Village. A small stream flows past the base of the rock. The engraved surface faces westward.

PLATE XXVII, *b*.—This engraved rock is found about 300 yards nearer to



A. PETROGLYPH, DEEPLY INCISED; LODGE VILLAGE, ST VINCENT



B. PETROGLYPH, DEEPLY INCISED; YAMBOU PASS, ST VINCENT



Escape Village than the one seen in Plate XXVIII, *a*. The large figure at the bottom is the most interesting; it is not so deeply cut as the other engravings, and the incisions have a comparatively fresh appearance. The representation of the snake is the only one found in the island. The face of the rock contains a fair number of undecipherable markings. Both the Yambou petroglyphs have the rising sun. Attention is called to the cup-shaped cavity below the head on the right. There is some similarity in the formation of the ears of the heads of this petroglyph to Porto Rican examples. Between the two petroglyphs found in this valley is a flat rock bearing a circle which encloses a cross (fig. 76).



FIG. 76.



FIG. 77.



FIG. 78.



FIG. 79.

PLATE XXVIII, *a*.—This petroglyph is situated in the Yambou pass, on the windward side of the island. It stands in the middle of a pasture, which is dotted with large volcanic boulders. Probably the head on the left (fig. 77) originally had two projections. There is a faint line on the other side, and there are very faint indications of other marks on the central face (fig. 78), but they are not sufficiently clear to warrant their inclusion. On the back of the rock there is a face of a common type (fig. 79). The only indistinct line given is the one at the bottom of the monkey's body. During a previous visit we discovered traces of an original mark, but on this occasion we failed in our efforts to locate it. One of the heads is highly interesting: it appears to represent the head of a female; the hair is plaited, and the ear pendant seems to represent a peculiar kind of earring. Porto Rican petroglyphs have horned heads similar to some of the engravings in this example.

PLATE XXVIII, *b*.—This petroglyph is situated on the right of the Woods highway from Petit Bordel to Linley valley, and forms one of the boundary marks between the Petit Bordel and Rose Bank estates. The rock has an almost vertical front and faces the east. Most of the engravings are about half an inch wide and are very shallow. The bottom figures appear to be incomplete. Several horizontal lines are scratched across the lower part of it. It is not possible to say if these formed part of the original engraving; if they did, they probably indicate the process of operation. It may be that the figures were first outlined with a sharp implement and then finished by rubbing with wet sand. The three small figures at the top of the left-hand figure are not very distinct. There is a similarity between the engraving on the right and one of the St Kitts examples.

PLATE XXIX, *a*.—The cave in which these petroglyphs are found is on the left side of the Buccament valley, about 200 yards from the seacoast. It is cut out of the tuff agglomerate flow forming the ridge, which limits the extent of the valley

on the southern side. The cave is about 45 feet high and 30 feet wide, with a depth of at least 20 feet. The front opens into the valley. A large portion of the rear wall is covered with engravings. It was found exceedingly difficult to make a photograph giving a well-defined view of all the markings. Figures not included in the exposure are shown in figure 80, *a*, *b*, *c*, *d*, and figure 81. All

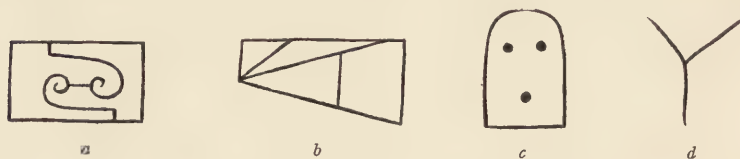


FIG. 80.

the engravings shown in figure 80 are cut in the rock which forms the shelf to the left of the cave. Figure 81 is scratched in the soft part of the tuff agglomerate and is situated a few feet above the shelf.



FIG. 81.



FIG. 82.



FIG. 83.



FIG. 84.

PLATE XXIX, *b*.—This photograph presents a view of the markings found at the entrance of the cave. Sometime ago the land in the immediate vicinity was brought into cultivation. The burning of the soil revealed a large number of fragments of pottery and a few rubbing stones. These fragments do not manifest any variation from the other sherds found in different parts of the island. It



FIG. 85.

may be interesting to note how one of the figures (fig. 82) seen on the right side of the photograph recurs time after time on the other petroglyphs. It is found at Safe Creek, Wyoming; Ojo de Benado, New Mexico; Ometepe, Nicaragua; and at Cachoeira de Ribeiro, Brazil. An earthenware stamp bearing this figure (fig. 83) has just come to hand from Carriacou. The character, with not quite the same curve, is represented at Chicagua Rapids, Venezuela. Another figure (fig. 84) with slight modifications is found on an engraved rock at San Esteban, Venezuela. Other figures of this petroglyph are found in various parts of South America, two of which (fig. 85) seem to be very common.

THE HEYE MUSEUM
NEW YORK CITY



A. PETROGLYPH, DEEPLY INCISED; YAMBOU PASS, ST VINCENT



B. PETROGLYPH, SHALLOW ENGRAVING; PETIT BORDEL, ST VINCENT





A. PETROGLYPHS ON BACK OF WALL OF BUCCAMENT PICTURED CAVE, ST VINCENT



B. PETROGLYPHS AT ENTRANCE TO BUCCAMENT PICTURED CAVE, ST VINCENT



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PREHISTORIC OBJECTS FROM A SHELL-HEAP AT ERIN
BAY, TRINIDAD

PREHISTORIC OBJECTS FROM A SHELL-HEAP AT ERIN BAY, TRINIDAD

By J. WALTER FEWKES

INTRODUCTION

IN the winter of 1912-13 the author visited the Lesser Antilles with a view of gathering data for a contemplated memoir on the aborigines of those islands.¹ He visited the more important private collections of prehistoric objects, as well as those in public libraries and museums on the islands. Incidentally he carried on excavations, of a limited nature, at Banana bay, Balliceaux, where the Black Caribs of St Vincent had a settlement before they were deported to Ruatan on the coast of Honduras. Excavations believed to be important were made in a shell-heap in Trinidad, one of the largest and culturally most important of the Lesser Antilles. The present paper considers the more instructive results of the work last mentioned.

Trinidad is well adapted for the home of an aboriginal people. It has constant fresh water, an abundant supply of food, its mountains and plains being well stocked with animals, the sea affording an abundance of fish, mollusks, and crabs, and its soil yielding a large variety of edible roots and fruits. The island lies in full view of the coast of South America and was visible to the natives inhabiting the Orinoco delta. On its lee side the water is shallow, but landing can be made at many places in small craft. There are high hills in the interior, level savannahs along the coasts as well as inland, and streams of fresh water that open into brackish lagoons.

Early historical references to the Indians inhabiting Trinidad date from the discovery of the island by the great Genoese. As

¹ This visit was made under the joint auspices of the Bureau of American Ethnology and the Heye Museum. The specimens collected are in the latter institution.

Columbus on his third voyage, in 1498, sailed with his companions along the shore of the newly discovered island which he had named after the Holy Trinity, writes Peter Martyr, "From their ships they could see that the country was inhabited and well cultivated; for they saw well-ordered gardens and shady orchards, while the sweet odours, exhaled by plants and trees bathed in the morning dew, reached their nostrils." Following the shore somewhat farther, Columbus "found a port sufficiently large to shelter his ships, though no river flowed into it." There was no sign of any habitation in the neighborhood of this harbor, but there were many tracks of animals similar to goats, and in fact the body of one of these animals was found. On the morrow "a canoe was seen in the distance carrying eighty men, all of whom were young, good looking, and lofty of stature. Besides their bows and arrows, they were armed with shields, which is not the custom among the other islanders.¹ They wore their hair long, parted in the middle and plastered down quite in the Spanish fashion. Save for their loin-cloths of various colored cotton, they were entirely naked." Columbus naïvely declared that he followed in this voyage the parallel of Ethiopia, but recognized that the people he found in Trinidad were not Ethiopians, for the "Ethiopians are black and have curly, woolly hair, while these natives are on the contrary white [lighter in color?] and have long, straight blond hair."²

According to Las Casas, who is said to have possessed accounts of the third voyage of the great Admiral which are now lost, the sailors of Columbus saw human foot-prints on the shore of Trinidad and discovered implements showing that the aborigines were fisherman. As Columbus skirted this coast he observed houses and cultivated fields "*bien probada a labrada*," indicating that

¹ The Orinoco Indians had elaborate shields.—J. W. F.

² It is not improbable that in ancient times there was frequent communication between the inhabitants of the mainland of South America and Trinidad, a communication that was kept up until quite recently, for it was only a few years ago that canoe-loads of Indians were accustomed to land at Erin bay, at rare intervals, and make their way by an old Indian trail to the present city of San Fernando, via Siparia, through the original forests. These visits are now made primarily for trade and are probably a survival of a custom quite common in prehistoric times. Well-marked "Indian trails" can still be followed through the forest depths.

agriculture as well as fishing was practised by the natives. In the meager reference to the people given by Las Casas, he says incidentally that "they were lighter and better proportioned than those of the other Antilles, and wore their hair long like the women of Castile. They wore variegated cloth head-bands, and girdles on the loins. The men were armed with bows and arrows, and, unlike the inhabitants of the other Antilles, had [war] shields."¹ The identity of these people is not clear from this early account, but somewhat later they were referred to as Arawak.

Sir Robert Dudley, in 1595, made a journey through Trinidad and lodged in "Indian towns," finding the natives a fine-shaped and gentle² (*sic*) people, naked and painted red.

Later, Sir Walter Raleigh enumerated the following "nations" or races in Trinidad: Yaïos, Amecos (Arawak), Salvagay (Salivas), Nepoios, and Carinepagotos. At the end of the seventeenth century there were said to have been fifteen Indian towns in Trinidad, but the 2,032 aborigines recorded as inhabiting the island in 1783 had dwindled to 1,082 ten years later.³

In some of the early historical references to Trinidad, all the natives are classed as Arawak.⁴ Thus Davies⁵ writes: "It was when the Captain was engaged for the war against the Arawages who inhabit Trinity [Trinidad] Island, and to that purpose he made extraordinary preparations." In other references to the Trinidad aborigines which might be quoted, the name Carib does not occur, and indeed there is no good evidence that there were Carib on the island, notwithstanding several of the above-mentioned tribes are supposed by some authors to be divisions of "Caribs."

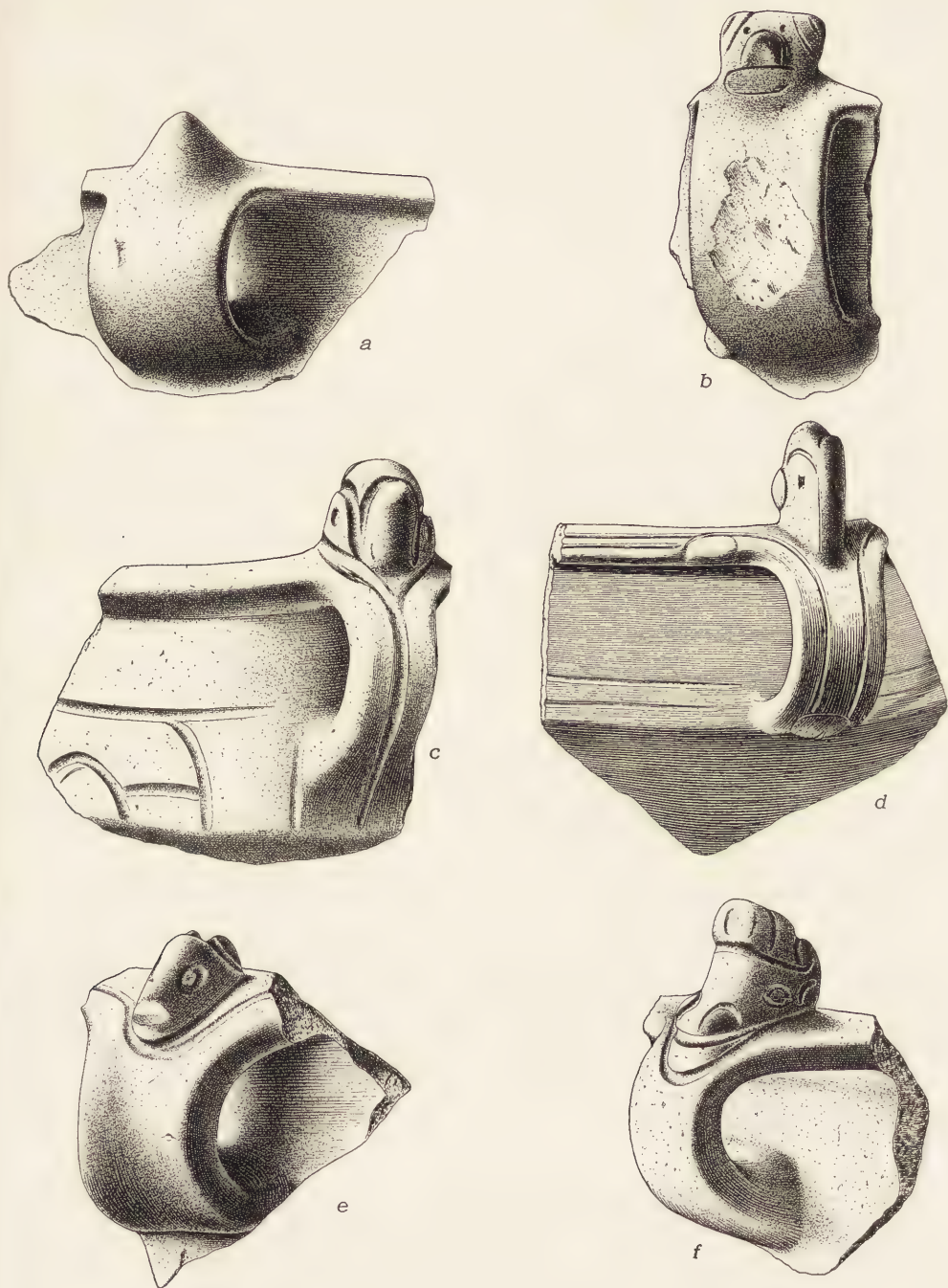
¹ The Warrau, who lived on the mainland, have a large square shield called *ha-ha*, used in athletic sports. (See E. F. im Thurn, *Among the Indians of Guiana*, London, 1883, p. 327.)

² This is not characteristic of the Carib, according to ideas current then or in later times. It may be noticed, *en passant*, that there is no mention of Carib in the early accounts of the Indians in Trinidad seen by Columbus.

³ On Bryan Edwards' map of the West Indies an "Indian town" appears on the east coast of Trinidad.

⁴ The historical evidences all agree that the people of this island were an agricultural race allied in culture to Arawak.

⁵ *History of the Caribby Islands*, 1661.



POTTERY OBJECTS FROM TRINIDAD

a. Bowl handle with conical projection. *b.* Bowl handle with head. *c, d.* Sections of vessel with animal heads. *e, f.* Handles with animal heads.



The nearest approach to pure-blood aborigines of Trinidad live at Arima, in the middle of the island; but aboriginal features can still be found elsewhere among the inhabitants, although the author was unable to learn of a person who could speak any aboriginal language once spoken on the island, or that there were any Indians of pure blood remaining. There survive in Trinidad numerous Indian place-names, as Arima and Naparima; but while some of these suggest names existing in Porto Rico and St Vincent, they are as a rule dissimilar, indicating different languages. The prehistoric inhabitants of Trinidad were probably linguistically distinct from those of the other islands.

Additional knowledge of the culture of the aborigines of Trinidad can be acquired either by archeological research or through survivals in folklore, which are very common.

ERIN BAY, TRINIDAD

The small settlement at Erin bay consists of a few shops, two churches, and a number of dwellings along a well-built road that passes through the town to a warehouse on the shore. Small steamers anchor at intervals a few miles from the coast, but the best way to reach the settlement is by steamer from San Fernando to Cap de Ville and by carriage from the landing. It can also be visited from San Fernando by road, via Siparia. The only accommodations for remaining over night at Erin are at the Government House.

The present population consists almost wholly of blacks and East Indian coolies indentured to English planters or overseers, who own or manage the larger estates. The vernacular is a French patois of peculiar construction and incomprehensible to any but the inhabitants. The plantations are large and considerably scattered; they produce profitable crops, mainly cocoa and tropical fruits that are shipped to Port of Spain for export.

Not far from Erin there are remnants of the primeval forests in which game, monkeys, and tropical vegetation abound. The land is rich and productive, and the estates are prosperous. There are a few small kitchen-middens on the coast, not far from Erin, some

of which will well repay excavation, but their isolation is a practical difficulty unless complete and systematic work be done.¹

There are several shell-mounds on the eastern coast of Trinidad which show fragments of pottery and other rejecta, and several heaps on the southern shore that are superficially composed of shells. In the so-called shell-heaps at San José, the shells are few and inconspicuous, but in a midden at Point Mayaro, which covers a fairly large area, many characteristic potsherds may still be found on the surface. As a rule these shell-heaps are not far from the shore, but in several instances they lie inland.²

Fragments of pottery from this region sent to the author by Mr Dearle of Port of Spain differ from those of Erin bay, but apparently were made by people in the same stage of culture. There is a small collection from this region in the Heye Museum, obtained after this report was completed, which contains a number of highly instructive heads and other fragments. This pottery is colored white and purple-red, whereas that from the shell-heap at Erin bay is painted bright red, although the color is often worn, showing gray beneath.

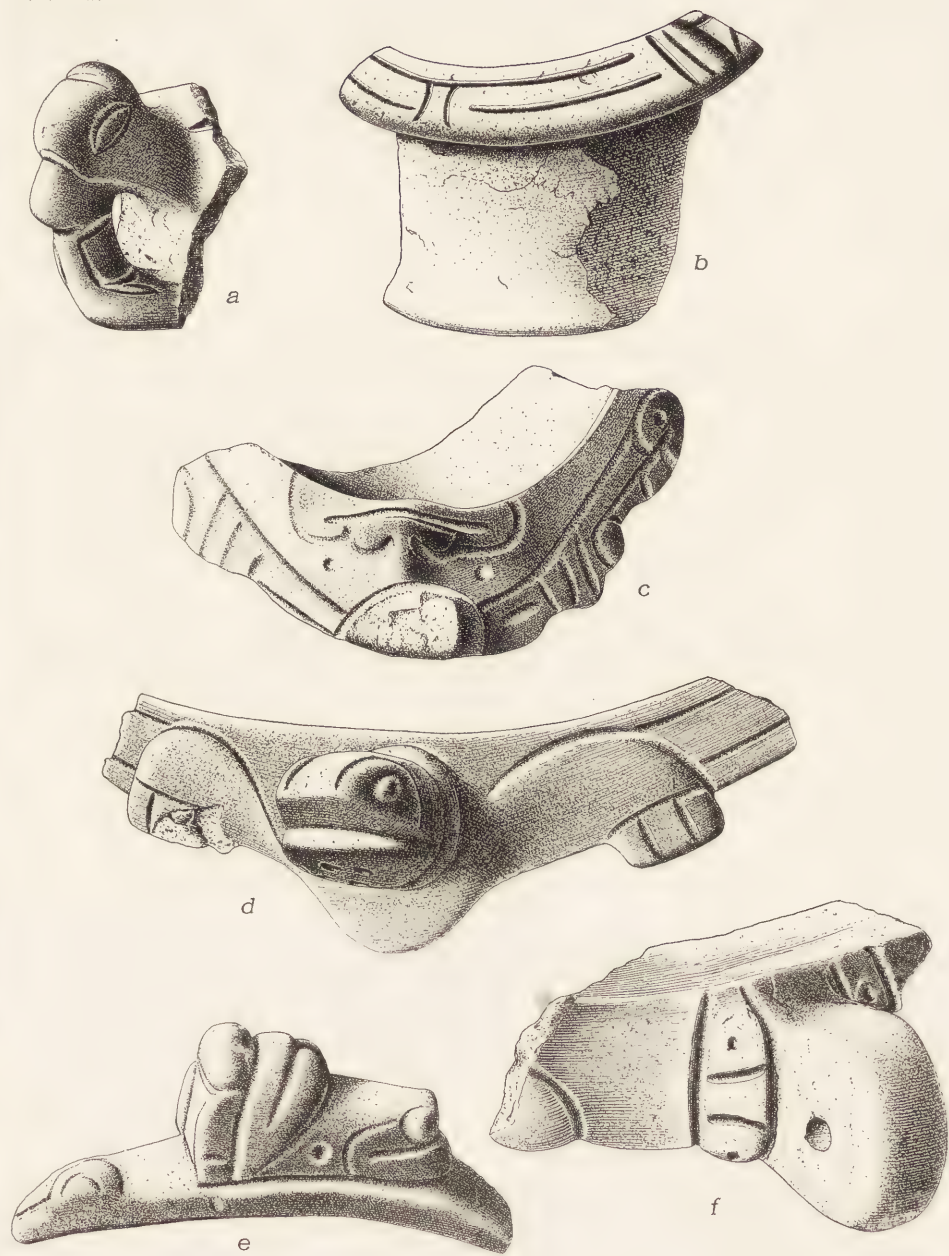
TCIP-TCIP SHELL-HEAP

The largest shell-heap in Trinidad, locally known as Tcip-tcip hill, situated at Erin, a short distance from the shore, covers several acres and forms a considerable elevation. Upon this mound are constructed the government buildings, the police station, and the warden's office. The author obtained from the assistant warden, Mr John Menzies,³ permission to make excavations in that part of the shell-heap situated on Crown land, but was obliged to suspend

¹ Trinidad has never been regarded as a remunerative field for archeological investigation. The first results of the author's efforts in the island were not very promising, but after some discouragement, excavations of a shell-heap at Erin bay, in the Cedros district, yielded important data bearing on the former culture of the aborigines in this part of the island.

² Efforts to find evidences that man inhabited the numerous caves in Trinidad, or used them for burial purposes, have not been rewarded with success, although many caves, especially those near Pedro Martin's basin, were examined.

³ The author is very grateful to Mr Menzies for his aid, and takes this opportunity to thank him for his many kindnesses while at Erin bay. He is likewise indebted to Mr Dearle, of Port of Spain, for voluntary aid in the excavations.



POTTERY OBJECTS FROM TRINIDAD

- a.* Handle with modified head. *b.* Section of rim of vessel. *c.* Rim of effigy bowl. *d.* Rim with head and flippers.
e. Rim with head. *f.* Flattened disk with circular handle.



work on the private land adjoining, as it could not be thoroughly explored without injury to the property. The specimens, although limited in quantity, are the most numerous known, and give a fair idea of the nature of the contents of a typical Trinidad shell-heap.

Tcip-tcip hill was first described by Mr Collens, whose excavations therein were rewarded with several fine specimens, now on exhibition in the Victoria Institute at Port of Spain. These objects are figured by Collens in his *Handbook of Trinidad*, and are also illustrated by the present author in his *Aborigines of Porto Rico*.¹

Some limited excavations were also made at Tcip-tcip hill by the Reverend Thomas Huckerby, of San Fernando, several years after Collens finished his work, but only a few fragments of pottery, now in the Heye Museum, were obtained.

The extent of the Tcip-tcip mound could not be determined, as it extends far into the cocoa plantation under a dense tropical growth. Its surface, except where cleared by the Government for the erection of buildings, was covered with vegetation. Some distance from the hill, where a ceiba tree had fallen, the roots showed a considerable deposit of shells, indicating that the extent of the heap was great and furnishing a clue for continued excavations.

The shells in the mound at Erin are in layers alternating with vegetable mold, ashes, and soil, forming a sticky mass² that clings tenaciously to the specimens and almost conceals their identity. The terra-cotta heads, when dug out of the earth, were completely coated with mud which had to be removed by washing, and by so doing some of the red pigment which covered them disappeared. As the ceramic objects had been painted after they were fired, the color is not permanent, and the length of time they had been in the ground caused it to come off even more readily.

As mentioned, a vertical section of the mound exposed alternating layers of shells and ashes, mingled in some cases with humus and with frequent fragments of charred wood. Sometimes the strata were composed entirely of shells, but their thickness was not uniform, especially at the periphery of the mound. Over the entire

¹ *Twenty-fifth Annual Report, Bureau of American Ethnology*, pl. lxxxv.

² During the author's work in Trinidad it rained almost every day.

surface of the mound there was a dense growth of tropical vegetation, with clearings at intervals for cocoa and plantains. The fallen trunks of palms, live shrubs, and trees formed an almost impenetrable jungle extending into the neighboring forests where the ground had not been cleared. On the sea-side the mound is only a short distance from the shore and is separated from the bay by a lagoon inclosed by a narrow strip of land. Near by is a spring from which the shipmates of Columbus obtained drinking water in 1498.

In their general character the objects found in the Tcip-tcip mound are not unlike those occurring in other West Indian middens, although they differ in special features. As is usually the case, the majority of the specimens are fragments of pottery, which are among the most instructive objects by which culture areas can be defined. These will be considered first.

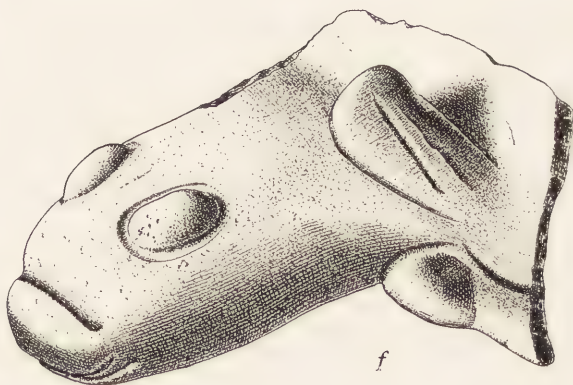
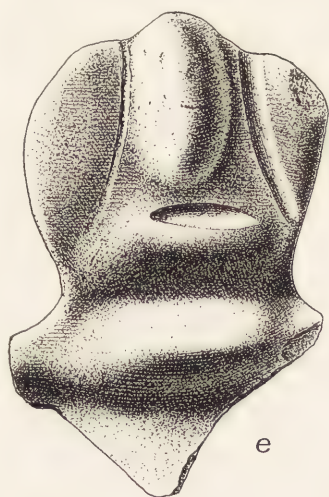
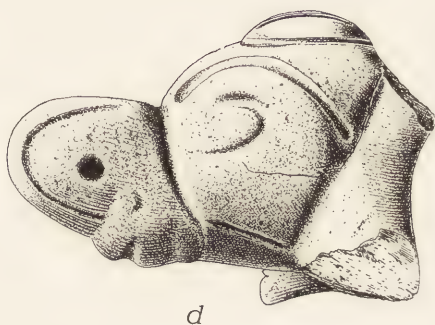
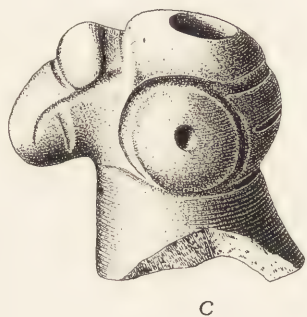
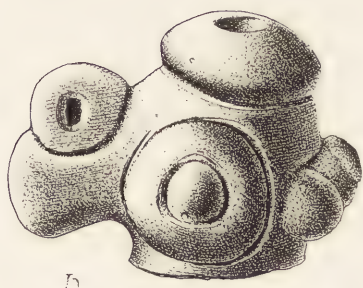
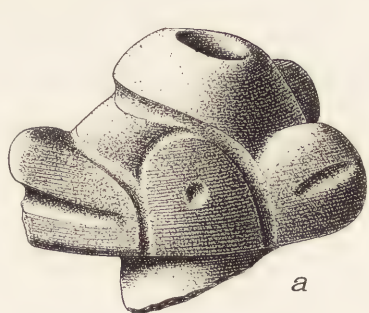
POTTERY

Comparatively little has been published on the pottery of the Lesser Antilles, although specimens of whole jars and innumerable fragments are found in various museums and private collections. The Heye Museum is the richest in the world in these objects. The potter's art was practised by aboriginal people from Trinidad to Cuba and the Bahamas, but while there is general similarity in the product, there are very marked specific differences.

The several beautiful specimens of pottery in the Victoria Institute at Port of Spain, Trinidad, two of which, through the kindness of the officers of that institution, were photographed, have been reproduced by the author,¹ who has quoted the description in the appendix in Collens's *Guide to Trinidad*, here reprinted as it contains practically all that has been published on the archeology of Trinidad.

"The discovery of some interesting Indian relics at Erin during the past month [May, 1888] is, although I had brought my work to an end, of sufficient importance to demand a brief notice. On the occasion of a recent visit of His Excellency, Mr. W. Robinson and suite to the southern quarter of the island, the Hon. H. Fowler, who was one of the party, observed a mound of shells. Dis-

¹ Aborigines of Porto Rico, *Twenty-fifth Annual Report, Bureau of American Ethnology*, pl. lxxxv.



POTTERY OBJECTS FROM TRINIDAD

a, b, c. Bottle heads. *d.* Head. *e.* Conventionalized head. *f.* Elongated head.



mounting, a closer inspection revealed some pieces of rude pottery, and subsequent excavations by Mr. A. Newsam, the Warden, led to the unearthing of some capital specimens, indicating beyond a doubt this had been the centre, at some period more or less remote, of an Indian settlement. The pottery is of two kinds, glazed¹ and unglazed, the latter dating back to a time anterior to the discovery of the New World, for the art of glazing was unknown to the early Indians, nor is it likely that they became acquainted with it after the Spanish occupation."

The following specimens are figured by Collens:

FIG. 1. A hollow stone, smooth in the concave part, forming a rude mortar.

The Indians used a hard, smooth pestle for pounding their seeds and grains.

FIGS. 2, 3, 4. Heads of animals in burnt clay, more or less grotesquely shaped.

The eyes and mouth are exaggerated, a few, broad, bold lines serving to bring out the most striking features. In fig. 4 the head of the monkey is fantastically crowned. All these are probably deities or ornamented attachments of earthen vessels.

FIG. 5. A well shaped squirrel. Perhaps a toy whistle.

FIG. 6. An earthen bowl in fine preservation, about the size of an ordinary vegetable dish. With the lid, which is unfortunately missing, there would doubtless be a good representation of a turtle; as it is the head and tail are clearly, and the limbs somewhat clumsily shown."

The best entire vessel found by the author in his excavations at the Erin bay midden is the shapely brown vase shown in figure 64. This receptacle was buried two and half feet beneath the surface, in a thick layer composed wholly of shells. Its association and situation show no indication that it was deposited with care, and it could not have been a mortuary vessel, as no bones were found near by: it appeared rather to have been abandoned or dropped by its owner where it was found. The shape of this vase is an uncommon one in prehistoric West Indian pottery. In form it is



FIG. 64.—Bowl with ring at base and incised decoration.

¹ The author regrets that he cannot support Mr Collens's statement that glazed pottery occurs in the Tcip-tcip mound.—J. W. F.

enlarged equatorially, and tapers above to a recurved lip, which, as is rarely the case in West Indian earthenware, is without handles or lugs, and below, in which region the exterior is slightly convex, to the base. Decoration in the form of incised lines appears on the surface of the upper area, but the under portion is smooth and without ornamentation. This decoration consists mainly of parallel grooves alternating with crescents, and circles with central dots. The walls of the vessel are thinner than is usual in West Indian pottery, and the surface is little worn. An exceptional feature of this receptacle is the base, which consists of a circular stand, thus rendering stability to the vessel. Similar bases of other specimens, being much more substantial than the bodies, are frequently preserved entire while the remainder has disappeared. This form of base is of common occurrence in fragments also from St Vincent and Grenada, but is rare in Porto Rico.

Several bowls had been so long in the moist soil of which the Tcip-tcip mound is composed that they crumbled into fragments when an effort was made to lift them from their matrix. Although

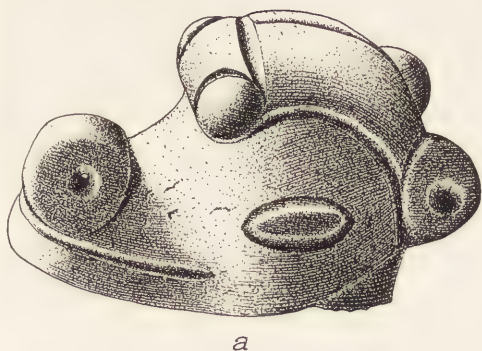


FIG. 65.—Bowl with flat base.

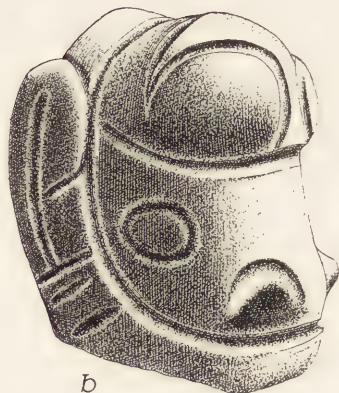
the forms of these bowls vary somewhat, several resemble that shown in figure 65, which may have been used for condiments or for pigment.¹ The walls of this vessel are thick, with smooth undecorated surface; its bottom is flat. The rim shows two opposite imperfections that may indicate the position of heads which served as handles.²

¹ Many fragments of red and green pigment were found in the mound. The majority of the vessels here described are of gray or bright red ware.

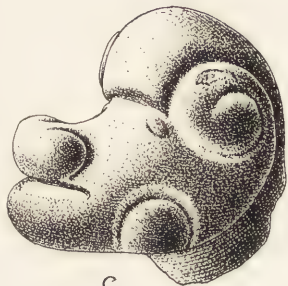
² After pottery objects were taken from the mound they hardened considerably, but the handles of this vessel may have been broken from the rim previous to its recovery.



a



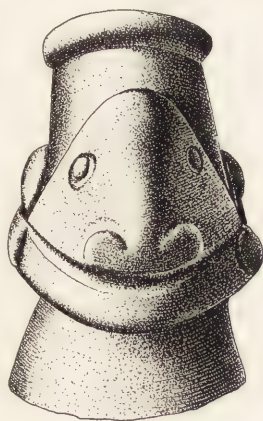
b



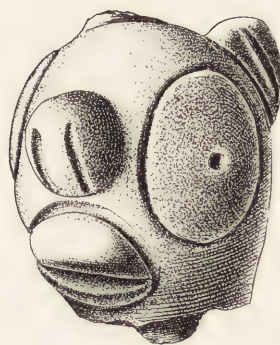
c



d



e



f

POTTERY OBJECTS FROM TRINIDAD

a, b, c, f. Heads. *d.* Head with broken rim. *e.* Head of bottle.



Figure 66 represents a small rude pottery rest, of spool-shape, with flat base, very thick walls, smooth undecorated surface, and somewhat flaring rim. Its size suggests that it was once used as a toy or as a ceremonial vessel, but it was more likely designed as a support for a bowl. Some beautiful pottery rests from St Vincent are in the Heye collection, several of which, in a fragmentary condition, were obtained by the author at Balliceaux. The most elaborate of these measures about six inches in height, is perforated on the sides, and has a face in high relief. This object will be fully described in a subsequent report.



FIG. 66.—Pottery rest.

The rectangular clay box shown in figure 67 has thick walls, a flat bottom, and squatty legs continuous with the sides. Its longer sides bear incised S figures surrounded on three sides by a straight furrow. The narrow sides of the vessel are ornamented with incised crescents also partly framed with straight lines. From

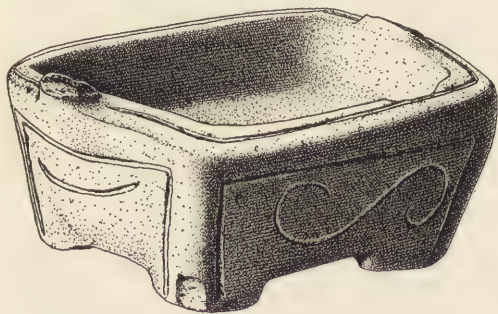


FIG. 67.—Rectangular vessel.

the broken places at the two opposite shorter sides of the rim it would seem that the vessel had been provided with handles, probably in the form of heads, but it is also possible that a head may have been attached to one side and a tail opposite, thus producing

an effigy vessel. Rectangular receptacles of this kind are rare in collections of West Indian pottery, a fact which imparts special interest to this example.

The object shown in figure 68 is a fragment of a bowl, shaped like a turtle, with head and tail, and the left legs drawn up to the

remaining side of the body. This interesting specimen is almost identical with the unbroken turtle effigy vase figured by Collens, to which reference has already been made. Although nearly half

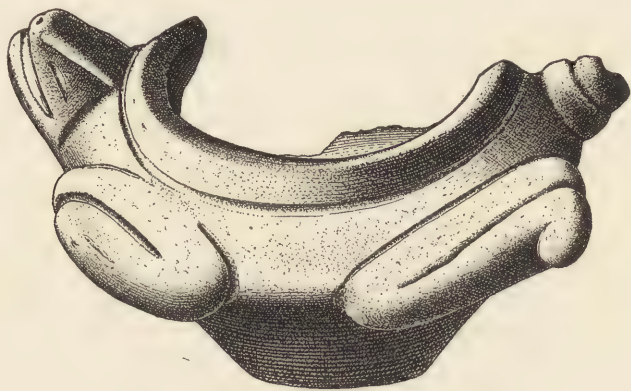


FIG. 68.—Fragment of a turtle effigy bowl.

of this specimen is absent, enough remains to enable a determination of its form and of the general character of the relief decoration, which was no doubt identical on the two sides.¹ The head, which is not attached directly to the rim of the vessel but to the upper side, is rather long, with blunt snout, and mouth extending backward;

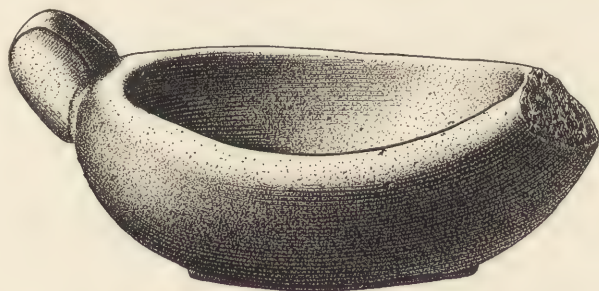
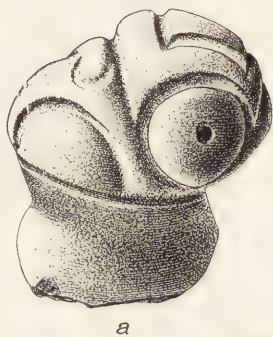


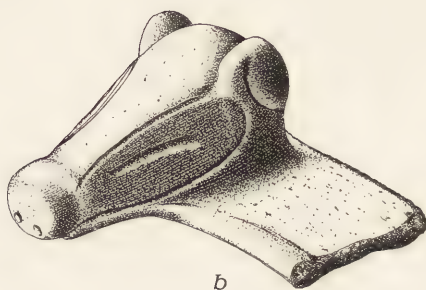
FIG. 69.—Effigy bowl possibly representing a turtle.

the nostrils are indicated by pits, the eyes by slits. The tail consists of two buttons separated by grooves, and the fore and hind

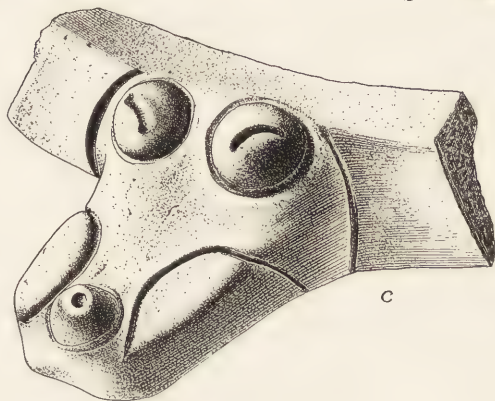
¹ Unlike the clay turtle figured by Collens, this specimen has no raised rim about the base. We know from historical sources that the turtle played an important part in Antillean mythology, which accounts for its frequent appearance on ceramic and other objects.



a



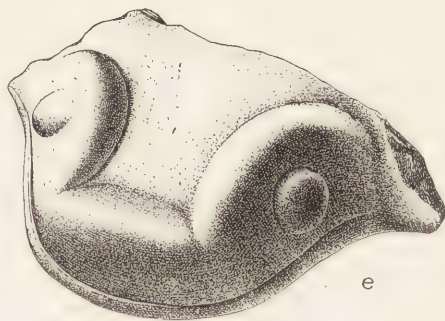
b



c



d



e

POTTERY OBJECTS FROM TRINIDAD

a, b. Heads. *c.* Head on section of rim. *d.* Head and body of shark. *e.* Flattened head.



legs, with no indication of flippers, are modeled close to the body. Like many Antillean earthenware vessels, the walls are thick and the rim not decorated.

The vessel shown in figure 69 is also supposed to be a turtle effigy, an almost featureless head being attached to the rim. Opposite the head the rim is broken, indicating where there may have been formerly an appendage representing the tail. This object fortunately is one of the few whole specimens in the collection.

In sharp contrast with the thick-walled, coarse bowl last mentioned, is a fragmentary vessel (fig. 70) which may be regarded as one of the finest and most elaborately decorated specimens found at Erin bay. This beautiful example represents the highest type of incised decoration of which the Antillean potter was capable. It shows the base and practically a quadrant of the lateral decoration of the bowl, which was probably repeated on the missing side.



FIG. 70.—Decoration on food bowl.

In addition to the specimens of entire pottery above described, many fragments, some of which represent characteristic forms, were excavated from the Erin shell-heap. The best of these are sections of rims and handles, which, being less fragile, are more readily preserved. Their chief features will now be considered.

HANDLES OF VESSELS

Considerable variation occurs in the form of the handles of earthenware vessels, several of which are still associated with portions of the side or rim, while others show how the handle was

attached at both extremities. Some of the handles are mere knobs or bosses, other examples are in the form of elaborate heads, the various modifications of which recall the pottery heads of Porto Rico and Santo Domingo.

The handles of bowls shown in the accompanying illustrations (pl. XIV-XIX) are broken from their attachments; sometimes they are very simple in form, but more commonly they represent heads which vary more or less in shape. The specimen (pl. XIV, *a*) which has a fragment of the bowl attached is one of the simplest forms, loop-shaped with a conical projection near the rim. The handle is broad, with ample space for the fingers. In some specimens the handles are even simpler, as they are without the conical elevation, while the upper end, instead of being attached to the rim, rises from the side of the bowl. In other examples the handle takes the form of a lug or knob.

In plate XIV, *b*, instead of a conical knob, the handle consists of a simple head in which the eyes, nose, and mouth are crudely indicated, as in other West Indian vessels.

Plate XIV, *c*, shows a specimen in which the head surmounting the handle is modeled in greater detail, and a sufficient part of the body of the bowl remains to show the incised ornamentation of the exterior surface as well as of the handle. Incised lines unite at the throat and continue down the middle of the handle throughout its length.

The figure of the handle illustrated in plate XIV, *d*, is similar to that of plate XIV, *c*, but the two incised lines ornamenting it continue along the rim of the bowl and end above an oval elevation evidently representing the body of the animal. The slender head of the animal projects upward; the eyes are small, and incised crook-shaped lines extend along the head and partly surround the eyes. The equatorial girth of this vessel is somewhat larger than the circumference of the rim and is decorated with two incised parallel lines.

Another variation in form of effigy handle is shown in plate XIV, *e*, the head represented in this case having a somewhat pointed snout, oval eyes surrounded by circular grooves, an open mouth,

and projections separated by grooves on the head. This is more massive than the handles before described; it is not incised, and its breadth at the middle is somewhat less than at the point of attachment to the body of the vessel.

One of the most elaborate heads ornamenting a handle partly free from the body of the vessel is shown in plate xiv, *f*. This handle, like the preceding, is thick and broad. When placed with the rim of the vessel uppermost, the two grooves may be identified as lips, the crescents above them as nostrils, and the ring on the side as an eye. If, however, the figure is turned in such manner that the rim is vertical, the eyes and what was identified as the forehead become the snout with nostrils and mouth.

The handle shown in plate xv, *a*, instead of being broad is small and rounded; it is decorated with incised lines, and the effigy portion is larger than the handle proper. The head is protuberant and the eyes lenticular. Although the other features of the head are considerably distorted, it would appear that the handle in this specimen extends from the top of the head instead of from the neck, thereby turning the mouth uppermost, as in the last example.

In the sections of the rims of vessels next to be described no handles are present. Plate xv, *b*, represents a rim ornamented with two incised, horizontal, parallel furrows, alternating with vertical grooves. This rim is broad and flaring, with rounded margins, imparting a convex surface to this portion of the bowl, which has a straight body and a flat base.

The incised ornamentation on the example shown in plate xv, *c*, is more elaborate than the last. In this case the rim is quite broad, somewhat pointed, and covered with furrows, indicating an elaborate figure which unfortunately cannot be wholly determined on account of its incompleteness.

Plate xv, *d*, exhibits a well-modeled rim probably representing a turtle with open mouth and rounded eyes. The pits under the lower jaw are uncommon, but like other features are suggestive of a turtle's head. The two appendages at the side evidently represent flippers.

The well-modeled head indicated in plate xv, *e*, is attached to

a section of the rim, but placed lengthwise instead of vertically as in other specimens. The snout is elongated, while the mouth extends far backward; the eyes are indicated by pits, and a round projection separated by grooves appears on the forehead.

The degree of conventionalization in these specimens is sometimes very great, as in plate xv, *f*, where practically all resemblance to a head is lost. Here we have a disk attached by one margin to the rim of a bowl, which is ornamented with a rude incised design. A handle distantly related to the last is illustrated in plate xvi, *a*.

It often happens that the walls of the orifice of a flask-shaped bottle are modified into a perforated clay head,¹ as in the specimens shown in plate xvi, *a*, *b*, *c*.

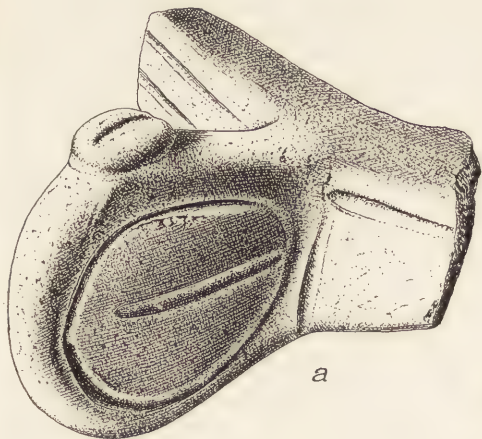
Plate xvi, *b*, *c*, *d*, *e*, show varying forms of effigy heads which served as handles of vessels. All of them have well developed nostrils, eyes, and other facial features. The presence of nostrils differentiates these heads from many others and affords a hint, although obscure, as to the identity of the animal designed to be represented. We find similar nostrils in certain three-pointed stone idols from Porto Rico, which we have other good reasons to identify as reptiles, hence the conclusion is fairly logical that these heads were intended to represent similar creatures.

The two projections on top of the head and the form of the eyes and nose of the effigy shown in plate xvi, *f*, are exceptional. The crescentic mouth is suggestive of the same organ in certain undetermined Porto Rican stone idols of three-pointed form.

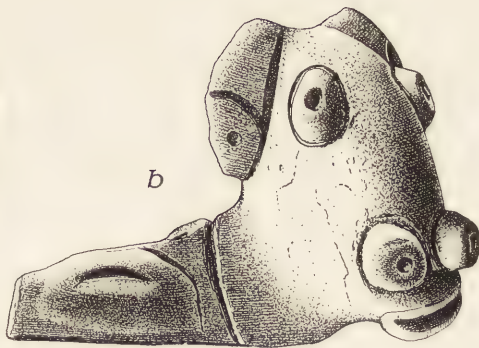
A remarkably well modeled reptilian head is shown in plate xvii, *a*. Its great elongation distinguishes it from the head shown in plate xvii, *b*, which is almost spherical and has the organs represented by incised lines rather than in relief. The same general tendency to rounded forms is exhibited in plate xvii, *c*, *d*, *e*, but in these the nose is notably exaggerated.

The head, and especially the position and form of the nose, of the handle shown in plate xvii, *f*, remind one of pottery from the Grenada region, a specimen of which is figured in the author's

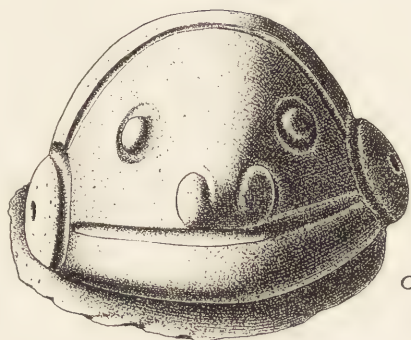
¹ This is the first example of a head from a prehistoric flask-like vessel from Trinidad or the Lesser Antilles, although common in Hayti and Santo Domingo.



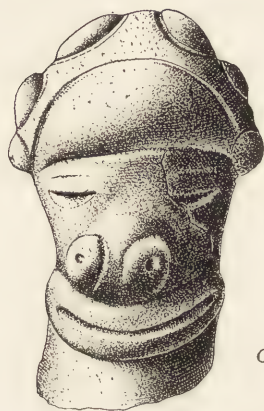
a



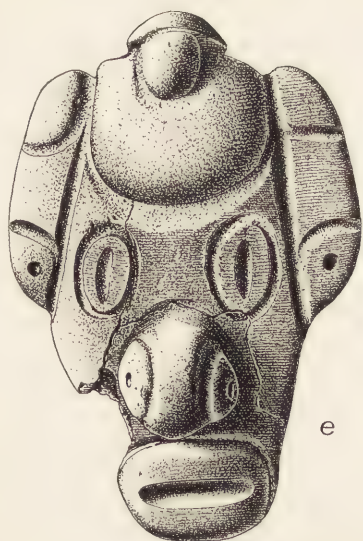
b



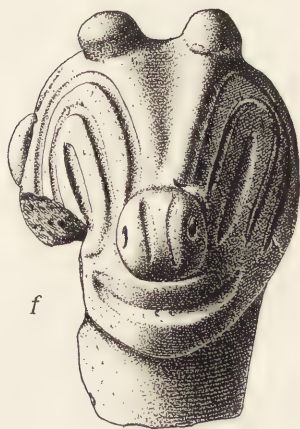
c



d



e



f

POTTERY OBJECTS FROM TRINIDAD

a. Round knob of vessel. *b-f*. Heads.



report on the *Aborigines of Porto Rico*.¹ In this instance eyes, nose, and mouth are indicated by hemispherical protuberances; the nostrils are represented by parallel slits, the eyes by pits in the middle of a circular disk, and the lips by a transverse furrow in a circular boss. A somewhat similar method of indicating these parts is shown in plate XVIII, *a*, while in *b* the form of the head reminds one of a peccary, or wild hog. The mode of attachment to the rim of the vessel is quite apparent in this instance.

The unpaired nostril of the effigy shown in plate XVIII, *c* is indicated by a single pit in the summit of a conical projection; the eyes are prominent and contain crescentic slits. This head, as shown by a fragment of the rim still attached, projected farther beyond the bowl than is usually the case. The flat form of the head suggests an alligator, but it was evidently designed to represent a mythological conception rather than a realistic animal.

If superficial likenesses of conventionalized figures are regarded as reliable for identification, plate XVIII, *d*, might well be considered to represent a shark's head, for the position of the mouth in this specimen is well below the snout, which tapers above uniformly to its end. There is no doubt that the protuberances above the mouth were intended to represent eyes, while those near the rim of the vessel may have been designed for fins or other organs. No representations of nostrils or ears are apparent in plate XVIII, *e*, but the broad flat head has two eyes and a well developed mouth. The break at the point of attachment shows that it was a handle of a vessel.

The heads illustrated in plate XIX, *c*, *d*, *e*, cannot, by reason of their highly conventionalized character, be readily assigned to any of the forms above considered. There remains a considerable number of other pottery heads obtained at the Erin Bay midden, some of which are too greatly mutilated for identification.



FIG. 71.—Pottery stamp.

¹ Op. cit., pl. lxxxiv.

Figure 71 illustrates a clay stamp, one of a class of objects not uncommon in the Lesser Antilles. The face of this specimen is circular, with an incised design, and was probably used either for decorating pottery or in a manner similar to the clay cylinders elsewhere described.¹ These stamps are often elaborate. Some of those lately obtained by Mr de Booy from Santo Domingo bear images on their surfaces and rattle when shaken.

STONE IMPLEMENTS

Stone implements from the Erin Bay midden consist of celts, axes, chisels, pecking-stones, mortars, pestles, and other forms. A number of almond-shaped celts, like Porto Rican petaloids, were collected in Trinidad. The most interesting axe is flat, with notches cut at opposite edges, as shown in figure 72.

There is general similarity in the forms of the mortars found in the West Indies, but the pestles vary in different islands. In the



FIG. 72.—Notched axe.



FIG. 73.—Jadeite pendant.

Santo Domingo-Porto Rico area pestles commonly have handles decorated with animal heads or even with entire animals, but in the

¹ *Aborigines of Porto Rico*, pl. lxxxvi, a.

St Kitts region they are simple unornamented cones, pointed at one end, circular or oval at the opposite end, but with no differentiation of base, handle, or head. The Guadeloupe and St Vincent pestles are of the same general character as those from St Kitts, which are identical with those found in Trinidad.

There are several stones in the collection from the Erin shell-heap that were evidently used for pecking other stones or for pounding pigments or bruising roots. They are elongate, sometimes angular, with shallow pits on two or all four faces which served to facilitate handling by providing convenient places for the thumb and forefinger. Circular stone disks, probably used as grinders, were likewise found.

A small finely polished pendant (fig. 73) made of jadeite, perforated at one end, was found buried deeply among the shells in the Erin Bay midden. In finish this beautiful specimen recalls certain finely polished green petaloids collected in Porto Rico and other islands. The stone of which these objects are made does not occur in the West Indies, a fact indicating that the pendant, as well as the celts, was brought from the mainland, probably from South America.

BONE OBJECTS

Considering their occurrence in soil saturated with moisture, it is remarkable that bone objects were preserved in the Erin Bay mound, but many unworked animal bones and a few bone implements were exposed in the course of the excavations. One of the latter is from an unidentified animal, and its flattened form resembles a spatula used in pottery making. Among other bone implements may be mentioned a tube of uniform diameter, supposed to be an ornament, cut off at both ends and having a slit extending along two-thirds of its length.

OBJECTS OF WOOD

A fine black finger-ring, similar to the rings made and worn by the natives in several islands of the West Indies, was found deep in the shell-heap. It is made from a seed of the gougou palm. An angular fragment of lignite of irregular form, with an artificial groove encircling it, was found in one of the deepest excavations.

COMPARISON OF PREHISTORIC OBJECTS FROM TRINIDAD WITH THOSE
FROM OTHER ISLANDS

As is generally the case in archeological studies, pottery, from its greater durability and variety in form, is one of the most reliable types of artifacts for the study of prehistoric culture areas in the West Indies. The Erin Bay shell-heap shares with the middens of other islands a predominance of earthenware with effigy forms and relief decoration, and the incised ornamentation of pottery vessels from this mound are strictly Antillean. When we compare these specimens with those from Porto Rico, we notice certain specialized features which are distinctive. In geometric designs the incised lines do not end in an enlargement, nor are their extremities accompanied by pits as is almost always true of pottery from Santo Domingo and Porto Rico. Comparatively few elongated heads of reptiles are found on pottery from Porto Rico, but such forms are common from the shell-heap at Erin bay. The heads from Porto Rico are mainly grotesquely human in form. As a rule the rims of the earthenware vessels from Porto Rico have approximately the same thickness as the vessels themselves, whereas in Trinidad they are often enlarged, or turned back, and are commonly ornamented with figures as in the pottery from Grenada and St Vincent.

While it has been necessary to make comparisons mainly from fragments, it is believed that the number of characteristic forms of pottery figures from this and from more northerly islands are sufficient to separate the two and to lead to the belief that the pottery from Trinidad is most closely allied to that of the Grenada area, as would be naturally suspected, and that it is only distantly related to that of the Greater Antilles.¹

While the evidence is not decisive, it appears from the material available that the Trinidad pottery is nearer that of South America than to any of the northern islands of the West Indies. This fact may be explained by the situation of Trinidad, which lies within sight of South America, a fact that led to an interchange of cultures and peoples of the two localities.

¹ The author has many drawings of St Kitts pottery which shows still greater difference in form and ornamentation.

The nearest point in South America where excavations of shell-heaps have been made is the Pomeroon district,¹ British Guiana, whence we have a few specimens of pottery. None of these are so well made as those from the Erin shell-mound, and there are other indications that the ceramic art had reached a higher development in the islands than on the adjacent mainland.

Regarding the Pomeroon shell-heaps, im Thurn reached the following conclusions: (1) "That they were not made by resident inhabitants of the country, but by strangers; (2) that these strangers came from the sea, and not from farther inland, and (3) that these strangers were certain island Caribs, who afterward took tribal form in Guiana as the so-called Caribisi, or, as I have called them, true Caribs."

Attention has been called at the beginning of this paper to the fact that the Trinidad aborigines are not spoken of as Carib, and the archeological objects show no likeness to the work of this people, but rather to that of the Arawak, who were the great potters of the Orinoco.

The well-made pottery of Erin bay suggests an agricultural population rather than the nomadic Carib people, and the form of certain flat clay platters, or griddles, is not unlike those used by the Arawak in the preparation of meal for cassava cakes. The aborigines who made these objects were in a stage of culture similar to that of a people of the West Indies before the coming of the Carib in prehistoric times. Pottery making is more strictly a characteristic of meal eaters, and as the South American Arawak were well-known potters, we cannot go far afield if we ascribe the pottery from Trinidad to a kindred people. The nearest South American people to whom we would look for their kindred are the Guaranos, or Warrau, some of whom still inhabit the delta of the Orinoco, only a few miles across the Gulf of Paria, an inland sheet of water which separates Trinidad from the continent.

Although im Thurn identifies the builders of the Pomeroon shell-mounds as insular Carib, he gives some weight to the theory

¹ E. F. im Thurn, *Among the Indians of Guiana*, London, 1883. See also Rev. W. H. Brett, *The Indian Tribes of Guiana, Their Customs and Habits*, London, 1868.

that they were Warrau, which theory, however, he does not discuss and apparently does not accept. It seems to the author that the pottery found in the Tcip-tcip mounds indicates a culture higher than that of the Carib, and more advanced as art products than any thus far collected from the Warrau. He regards it as a localized or autochthonous development originally of South American origin, but belonging to the same great prehistoric insular culture found in the Antilles from South America to the Bahamas and Cuba. This culture had been submerged by the Carib in some of the smaller islands, but persisted into the historic epoch in the larger islands which Carib could not conquer.

The conclusion reached from a comparison of the objects from the Erin Bay midden is that while there is a general likeness in pottery from all the islands of the West Indies, there are special ceramic culture areas in different islands. It is also believed that the Carib had no extensive settlement in Trinidad, and that they came to the other islands long after agricultural people had developed on them, or were renegades from some of the islands where the uncertainty of crops drove them to become marauders on others.

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D. C.

[Reprinted from the BULLETIN OF THE AMERICAN GEOGRAPHICAL SOCIETY, Vol. XLVI, No. 9, 1914.]

RELATIONS OF ABORIGINAL CULTURE AND ENVIRONMENT IN THE LESSER ANTILLES

By J. WALTER FEWKES

In late years the geologist, climatologist, and oceanographer have largely increased our knowledge of the Lesser Antilles, and naturalists, especially students of fauna and flora, have made important contributions to what was known of the distribution there of animals and plants. The ethnologist and archeologist are now able to give a clearer picture than ever before of aboriginal culture history in the Antilles in pre-Columbian times.¹ In this wealth of material gathered by the specialists the student of the relation of culture history to environment will find a rich field for his studies.

That large part of modern geography dealing with the relation of the earth and man has hardly considered this material, possibly on account of its extent, or the probability that any generalization on what is now known would be premature, so rapidly are new facts accumulating in this field.

In the following pages the author has ventured to consider one aspect of the relation of Antillean culture history to environment, and has limited himself to the aborigines, or so-called pre-Columbian inhabitants, and those features of the physical surroundings that have directly affected them.

Among the influences that have powerfully affected man in the West Indies are geological features, climate, ocean currents and winds, fauna, and flora. Among geological influences may be mentioned contour and relief, extent of coast lines, stability and distribution of land that can be cultivated, and different kinds of soils or rocks. Climate has affected agriculture more than any other physical environmental condition by determining the animals and plants available for food. Currents and winds are powerful agents in distributing organic life and determining the direction of human migrations on the ocean.

Physical Features. The Lesser Antilles, with the exception of Trinidad and Barbados, resemble a chain of volcanoes, or their

¹ The author will later publish an elaborate account of Antillean prehistoric culture based on the magnificent collection of West Indian Antiquities owned by George G. Heye, Esq., of New York.

summits, projecting out of the ocean. Some of these islands rise abruptly from the sea, while others have fringing coastal plains. Volcanoes are, from time to time, active, and igneous rocks predominate. The coast lines are continually changing and relief forms are not constant.

Fertile plains suitable for agriculture exist in many islands, and the shores of drowned river valleys present easy landing places for canoes or small craft, while submerged craters afford landlocked anchorage for larger vessels. Several of the islands are destitute of fresh water, while others have copious streams. In Dominica, the natives say, there are "as many rivers as there are days in the year," but the tufaceous rocks in other islands drink up the rain water before it forms a stream or gets to the sea. In islands having calcareous formations, evidences of former extension of the coast into the sea or elevations of the coast, due to volcanic or other agencies, are shown by the existence of living and semi-fossil genera of shells, echinoderms and corals high above the sea level. Changes in coast lines are common; and in the volcanic islands are abundant lava flows, one superimposed on the other, enabling the observer to measure the extent of the phenomena. The hard volcanic rocks supply material for stone implements; good clay on several islands invites the potter to her work. Sea shells, like *strombi*, have replaced stone for implements in islands like Barbados where there is no rock suitable for stone implements. The igneous boulders, being hard enough to resist rapid aerial or aqueous erosion, have preserved pictures cut upon them by the aborigines, but many of the rock cuttings were so shallow that they are either almost completely obliterated or barely legible.²

The longer axes of several of these islands extend approximately north and south, and, as they lie in the tropics where the trade-winds are constantly blowing from the northeast, their eastern side, or as it is called, the windward side, is almost constantly beaten by a heavy sea; on that side also the coast is much more eroded than on the western. On the latter side, however, the winds and waves not being so high, sandy beaches are more common and landing in small crafts is less difficult. The prevailing winds thus brought it about that the best sites for aboriginal settlements were on the lee sides of the islands, where the archeologist finds village sites, or middens, most abundant.

² Locally the boulders on which these pictographs occur are called "jumbies" or "altar" stones, the latter term implying a belief in their former use in sacrifices. The West Indian pictographs resemble those of Porto Rico on the one hand, and of British Guiana, on the other, and generally occur near the shore or on the banks of streams, convenient to landing places.

Natural caves occur in many of the islands, more especially those composed of soft calcareous rock or easily eroded tufaceous deposits. These caves, in some of the islands, as objects found near them show, were resorted to for mortuary and religious purposes. Many of the islands have no forests, few contain remnants of the original tropical jungles; others are destitute even of bushes; such an island as Antigua has no fresh water except that gathered in reservoirs.

Climatic and Hydrographic Conditions. The Lesser Antilles lie wholly within the tropics. Their temperature, however, is largely tempered by the ocean. The northeast winds blow so strongly that each island has two distinct climatic regions, the windward and the leeward, one under the régime of constant, cool ocean breezes and the other sheltered by highlands, with quiet water and low surf. As the islands have moderate elevation, the difference in temperature on the two sides does not profoundly affect the rainfall, although it has led to the concentration of a maritime people on the coast less exposed to surf raised by these winds.

The direction of the ocean currents has brought it about that, biologically, these islands are connected with South America, and we may suppose the original peopling of the majority of them was from that continent, either directly or indirectly. The great river, Orinoco, which discharges a volume of fresh water sufficient to render the Gulf of Paria, Venezuela, brackish, has had an important influence on the migration of plants and animals, especially marked in the fauna and flora of the southern members of the Lesser Antilles. Drifting logs that have floated from its delta to Barbados have no doubt carried reptiles, insects, seeds and even higher animals that would otherwise have been drowned. Floating trunks of trees, bushes and plants that could retain vitality in the salt water have been stranded on the islands. Paddles from Indian tribes dwelling in the Orinoco delta are, from time to time, found on the east coast of Trinidad. Ocean currents have likewise brought to the island organisms that live on the banks of the Amazon, and have, in that way, reached the Lesser Antilles from the land to the south rather than from lands to the west or north. But in the Greater Antilles, as Cuba, it is different; there the ocean currents set from the west, eastward, rendering these islands biologically allied to Central America rather than South America. The peopling of islands by man in early colonization follows much the same laws as that of plants and animals.

The South Equatorial Current crosses the Atlantic to the Caribbean Sea and, following the northeast and north coasts of South

America, impinges upon the shore, receiving what is discharged from large rivers and bearing its burden of life to its destination. There is little wonder that the Lesser Antilles, set like a net across its course, should capture some of the flotsam it bears. More than that, if the Gulf Stream can carry floating objects to Europe from the Gulf of Mexico, the Equatorial Current may have brought to the Lesser Antilles floating logs with clinging animals and plant seeds from the coast of Africa, across the Atlantic, not half the distance.

Biological Conditions of the Lesser Antilles. The land animals and plants, which practically supply the food of man, are largely dependent on the degree of heat or cold, moisture or dryness; in other words, on the climate of the region in which man dwells. The amount of heat and cold is due to elevation and latitude, ocean currents and prevailing winds, rainfall and other agencies. Moisture or dryness depends on the mutual relations of the earth, water, and air. The rainfall, land relief, nearness to the ocean, prevailing winds, ocean currents, and other causes, determine the character of the biota brought by ocean currents, winds or human agencies. This migration of the fauna and flora is partly voluntary, partly involuntary. Ocean currents have been perhaps the most effective agents in the involuntary transportation of plants and animals, but cultivated plants and domesticated animals have been carried by human agencies from one place to another. Such land animals as insects, lizards, and small mammals supplied considerable food, but there were no domesticated animals of size and the amount of food from terrestrial animals was never very large. The seas around the islands contain much animal food, as fishes, crabs, and mollusks, the last two being mainly collected from the shore laid bare by the high tide. Judging from the number of crab carapaces, and claws of the same, found in the middens on some of the islands, it would appear that crustacea supplied the aborigines with much of their food.

The importance of ocean currents, in the distribution of animal and plant life, has two aspects: (1) the regions of the adjacent continent to which the Antillean fauna and flora are related; (2) the animals and plants, occurring on these islands, that can be used as food. A distinction must be made between cultivated plants and domesticated animals brought by man, and those that have been transported by natural means, as winds or currents.

The food plants that played an important rôle in forming human culture on the Lesser Antilles in prehistoric times are the yuca or

manioc, the yam, potato, and various other roots. Maize may have been used as a food but not to the same extent as the roots above mentioned. The banana was made into a paste and dried in the sun; cocoa was grown by the aborigines, but not in great quantities. A favorite drink was an intoxicating liquor called the *ouycou*, manufactured from yuca meal which was fermented in large earthen jars. Most of these food plants were apparently brought by man from South America, his continental home. The flora of the Lesser Antilles is distinctly South American, and not allied to that of Central or North America.

In the same way it may be said that the fauna of these islands follows the same law; its natural affinity being with the great continent to the south. Few if any animals were carried to these islands by man in pre-Columbian times and it may be supposed that those used by man as food found their way there by natural means or unaided by man. The small mammals, reptiles, birds, and insects are akin to South America rather than to the Greater Antilles or North America. Several instances might be mentioned to illustrate this statement, but the following is sufficient, in a cursory treatment. The natural distribution of animals in the Antilles, according to Sir Harry Johnston, is well illustrated by the serpent fauna of Cuba, as compared with that of the Lesser Antilles: "In their serpent fauna," he says, "the southern groups of the Lesser Antilles (Guadeloupe to Trinidad) are more 'continental' and South American than is the case with the Greater Antilles." . . . These last, be it noted, are absolutely unconnected, in the affinities of their reptilian fauna, with Florida and North America, but offer some relationship to southern Mexico and Central America. These indications as to past land connections or approximations are further borne out by plant, bird, spider, fish and mammal distribution showing that the Greater Antilles have had no nearer neighborhood with the North American continent since the middle of the Secondary epoch (if then); that their last ancient land connection (Early Tertiary?) was with Central and not with South America; and finally that they, to some extent, shared with tropical America a connection with, or approximation to West Africa, perhaps as late as the beginning of the Tertiary Epoch."³

As Johnston has shown, the relations of the bat fauna of the Greater Antilles (Cuba, Haiti and Jamaica) are important. According to this writer, out of twenty genera of bats only one is

³ The Scenery of Cuba, Hispanola, and Jamaica. By Sir Harry Johnston. *The Geographical Journal*, June, 1909.

North American, three are peculiar to the Greater Antilles, and sixteen are found likewise in Central America.

Culture of Aborigines on the Lesser Antilles. Eliminating from our consideration Trinidad and Tobago, which belong culturally, as well as geographically, to the South American continent, we can detect traces of three distinct aboriginal cultures in the Lesser Antilles, viz.—(1) cave dwellers, or fishermen, hunters, fruit and root eaters; (2) agriculturists, “meal-eaters” (“Arawak”), who cultivated food roots by primitive methods; and (3) Caribs, a vigorous modification of the latter who obtained some of their food in the same way as the preceding, but lived mostly by raiding other islanders.⁴

It is probable that the most ancient aborigines of the West Indies inhabited caves, and it is known that survivals of these cave dwellers were mentioned in 1492 as inhabiting the western end of Cuba, the extensions on the western end of Haiti and Jamaica, which had become largely agricultural, and other islands. In many of these islands, however, traces of the cave life were even then archeological and legendary, but evidences of a preexisting cave life in all are almost universal. The agricultural or meal-eating culture was most highly developed in Porto Rico, Haiti and eastern Cuba, but traces of it existed in the Lesser Antilles, where the Caribs were dominant.

The inhabitants of the Lesser Antilles were more aggressive than those of the Greater Antilles, and among them a modification of the agricultural culture, called Carib, had been developed.

The derivation of Antillean man has been variously interpreted.⁵ The available evidence seems to point to the conclusion that the original peopling of the Lesser Antilles was from South America, but we do not know whether, at the time it occurred, the Antilles were a part of that continent or of a much more extended island now partly submerged in the ocean. Early man may have inhabited the Antilles much earlier than is generally supposed, or at a time when those many likenesses in the biota of South America and Africa originated.⁶ The aboriginal race had lived in Porto

⁴ The word “Indian” is applied by the present West Indians to the coolies, or laborers who were imported from India to work in the fields. As pointed out by Mr. Payne, in his “History of America,” the word “American” was applied to our aborigines up to the Revolution, but since that time it is generally used to designate a citizen of the United States. The present inhabitants of the Lesser Antilles call all prehistoric inhabitants of the island “Caribs” and all implements, pictographs, middens and pottery fragments are designated as “Carib.”

⁵ The reader will note that nothing is said about the provenance of the first human colonists in the Greater Antilles.

⁶ There is considerable literature on resemblances between freshwater fishes, insects and other animals of South America and Africa.

Rico and Haiti long enough to have evolved a highly developed neolithic stone age culture, as evinced by the perfection it attained in stone working, unsurpassed anywhere in America. But there is evidence that the earliest man was a cave dweller, and that he was followed by an agriculturist and, the author believes, that the Carib was evolved from the agriculturalist ("Arawak"?) as a direct outcome of a food quest which could only be satisfied by plundering neighbors.

There are several theories regarding the origin of the Caribs in the West Indies. It is held by some of the early authors that this race was an offshoot from North America, but this theory is now quite generally abandoned. Others have derived the insular Caribs from South American Caribs mainly on the ground of linguistic affinities and certain legends which are not wholly reliable. That there are linguistic relations of continental and insular Caribs goes without saying, but there are also linguistic likenesses between all the known Antillean languages and those of South America, and it is yet to be shown whether this differentiation of the Carib language occurred before or after their ancestors left South America. Sir E. F. im Thurn has derived the Guiana Caribs from those of the Lesser Antilles, instead of the latter from the former. The author suggests the theory of an independent origin of the Caribs of the islands and those of the continent and ascribes their linguistic and other similarities to ancestral racial likenesses.⁷

If the Caribs in the Lesser Antilles originated from South America and were racially the same as those of the Orinoco, how does it happen that some of them did not settle in Trinidad, which lies between the Carib islands and Venezuela? The same implied objection, slightly modified, may be made to im Thurn's theory.

It may be that the indefinite use of the word Carib by some early writers has led to a grouping of all marauders into an unnatural group. Archeological objects found in these and other Lesser Antilles indicate a sedentary agricultural race of which the Caribs may have been renegades, not a distinct race culturally.

Cave-dwelling Culture. There are evidences that an original cave culture, which preceded the agricultural survivors in the Lesser Antilles, continued in the West Indies even when the inhabitants had practically passed into the agricultural state. As among the aboriginal pueblo people of our Southwest, cave dwellers

⁷ The designation Carib, according to Oviedo, is an Arawak word meaning a warlike or fierce people, but not a distinct race. Dr. Chanca, to whom we owe the best account of the second voyage of Columbus, says that the Caribs occupied three of the Antilles, Guadeloupe, Dominica and Ay-Ay (St. Croix?).

and those who lived in habitations free from cliffs coexisted side by side, in early times, wherever there were caves. The prehistoric West Indian agriculturalists gave Ramon Pane legends of their former cave life, as has been elsewhere pointed out.⁸

The author's search for evidences that the numerous caves in Trinidad were inhabited was not rewarded with success. Several natural caverns near the pumping station, on the road from Port of Spain to Diego Martin's Basin, were explored with a hope that evidences of former habitation might be found in them, but these visits were not successful; and up to the present time, no evidences of cave dwellers has been reported from Trinidad. In Barbados, where there are geological formations that are readily eroded, caves are common and evidences of cave dwellers are not far to seek.

There are evidences that the series of natural caves at Mt. Gilboa in St. Lucy's Parish, Barbados, were inhabited in prehistoric times, and the so-called "Indian Castle," described by the Rev. Griffith Hughes,⁹ in 1750, was undoubtedly artificially excavated by the hand of man. This "castle," which lies about three miles to the east of Six Men's Bay, in Barbados, is a remarkable excavation and, if aboriginal, as the author more than suspects, it is the only aboriginal, artificial cave recorded from the Antilles. According to the Rev. Mr. Hughes, prehistoric shell chisels and an idol, which he figures, were found in or near this cave.

An examination of the floors of rock shelters, common in Barbados, has yielded evidences that they were inhabited. Artefacts of aboriginal manufacture have been found near their entrances, showing that they were habitations. The resemblance of these implements to those found in fields indicates that their makers were culturally not very unlike those dwelling near the middens along the lee shore of the same island. Available evidence that the ancient Barbadians lived both in caves and in pit rooms or artificially excavated chambers will be presented in detail in a later publication.

Several other islands of the Lesser Antilles have natural caves where evidences exist of former habitation by prehistoric man. The marks of human tools are not wanting on the walls of these caves, but, thus far, no efforts at systematic exploration of their floors have been made. The following quotation from Father Labat is instructive as showing the use of caves as burial places: "There is to be seen at Désirade, a little island to the windward off the coast of Guadeloupe, a very deep cavern almost full of bones with re-

⁸ Cave Dwellings of the Old and New Worlds. *Amer. Anthropologist*. 1900.

⁹ The Natural History of the Island of Barbados. By Rev. Griffith Hughes, A.M., Rector St. Lucy's Parish, London, 1750.

mains of bows and clubs and other arms of the ancient Indians; it was apparently a cemetery."

According to an old author, the women of Martinique had caves in which they lived or to which they retired at times. "They have great and strong caves or dens in the ground to which they flee for safeguard in case any men resort unto them at any other time than is appointed, and then defend themselves with bows and arrows." These same caves may be the "holes" to which Davies refers when he writes, "Thus the Arouages are forced (by the Caribs) out of their holes, to fight in the open field or run away." While it is not impossible that some such structures as pit dwellings were referred to in these accounts, the logical conclusion would seem to be that they were caves or rock shelters.

No evidences of cave habitations were found at St. Kitts or St. Croix, but they have been reported from the island of Guadeloupe. In many of the Antilles, caves that once furnished habitations for man became mortuary or religious chambers. The use of caves for religious purposes in the Greater Antilles is well known. The author will instance one cave in the Lesser Antilles in which religious objects have been found although there are several others where mortuary remains have been discovered and therefore connected with ceremonies. This cave¹⁰ is situated in Batowia, an island near Balliceaux, off St. Vincent; it has several niches in the walls one or more of which may have been used for idols. In this cave a sacred seat was found, several years ago, and taken to England, but its present whereabouts is unknown to the author.

Agricultural Culture. In almost all the Lesser Antilles the majority of aborigines had either abandoned cave life, and passed into the agricultural stage, or, as is generally the case, the two existed side by side. In those islands where there were no natural caves, it goes without saying that the inhabitants built huts in the open. The natives were agriculturalists and fishermen, including in the latter group those that made the shell heaps and middens, but this agricultural stage was not always uniformly developed; the objects found show diversity in form and degrees of technique and are more or less modified in different islands into typical forms. Certain well-defined subareas can thus be determined by the character of the artefacts which occur in certain islands or clusters of islands.

¹⁰ This was the cave where the late Mr. Frederick Ober found the wooden turtle mentioned and figured by him in "Camps in the Caribbees," and by the author in his "Aborigines of Porto Rico."

This difference in culture areas in the West Indies, as determined by implements, may be illustrated by a comparison of the aboriginal objects from Porto Rico with those of the Lesser Antilles. Several typical aboriginal objects found in Porto Rico have not been duplicated in any other West Indian island except Haiti, and, conversely, many objects from the other Antilles have not yet been reported from Porto Rico. It may rightly be supposed that the forms of these prehistoric Porto Rico objects were evolved quite independently of those in other islands; and as these characteristic objects do not exist in either North or South America, it is probable that they originated on the islands where they are found. In the same way, many stone objects occur only in the Lesser Antilles, and do not recur on either continent, or on any of the Greater Antilles, which limitation very naturally leads to the conclusion that they also were autochthonous and restricted in origin to the islands where they are found. The archeologist can judge the characteristics of culture only by artefacts, and before he can classify prehistoric cultures in the Lesser Antilles, preceding the advent of the whites, it is necessary to examine large collections from each island, and compare them one with another in order to determine the types peculiar to geographical areas. This is somewhat difficult when the source of specimens is doubtful; and reliable only when large local collections are compared. A study of these shows that different islands of the Lesser Antilles were not uniform in culture, and has led the author to a division of the Lesser Antilles into subareas, based on cultural and geographical data.

The sites of habitations or refuse heaps in the Lesser Antilles are now indicated by middens and shell heaps. Buildings of stone or any form of walled enclosures may have existed but are not known to have been constructed by the aborigines of the Lesser Antilles. Even the stone circles, called ball courts or *batey*,¹¹ of Porto Rico and Haiti, have not yet been found in these islands. Mr. C. B. Brown, in "Indian Picture Writing in British Guiana," has described one of these *batey*, once supposed to be characteristic of the Antilles, from the Pacarima Mountains in Venezuela, an instructive observation connecting South American and Antillean cultures.

Contiguity to the sea is a necessity for fishermen, and the small inlets that rivers or streams make in the coast would afford good

¹¹ The author has been informed that there is an enclosure that may have been of this nature in Carriacou, but he has not visited it.

fishing as well as fresh water.¹² Another reason for dwelling near the streams is given by Davies, in the following lines: "The inhabitants of the Caribbees are also desirous to be somewhat near springs, brooks and rivers because of their washing themselves every morning before they put the red paint on their bodies."¹³

Two kinds of houses, known as the secular and religious, were constructed by the aborigines of the West Indies, as is almost universally the case with man in primitive stages of culture. The latter served as the habitation of the head medicine man, or chief, but was also the god house or place where the idols (*Zemes*) were kept. It was generally larger than the other dwellings and occupied a more central position, the huts of the remaining people being commonly grouped about it. As these houses are described by many authors, one of the best, that from Labat, will serve to show their character: "Each family" he says, "composes its own hamlet, for the father of a family has his house where he lives with his unmarried children and wives, all the other children who are married have their establishment and their respective houses. They build one house common to all, called a *carbet*, which has a length of sixty or eighty feet, and is constructed of forked boughs, eighteen or twenty feet high, planted in the ground every twelve feet. They lay over these, branches of the *latimer* or other trees, perfectly straight, which answer as a plate on which they place the rafters extending down until they touch the earth; these they cover with reeds or the leaves of the *Bourbon palm*; so that it renders the interior of the *carbet* quite obscure, for no light enters except through the front door, which is low and only allows one to enter by bending down. The boys keep the *carbet* clean and sweep out the house and surrounding plaza. The girls and women clean their houses, [the men and boys the sacred house.] At the side of this *carbet* there is one special door by which the priest enters when his god calls him: he alone is allowed to pass this door."

The aboriginal villages of the West Indian agriculturalists, the sites of which are now indicated by middens, were probably not unlike those in *Guadeloupe*, described as follows:

"Here they found innumerable villages of twenty or thirty houses, at most, set round about an open space, like a market place." "And forasmuch," says Peter Martyr, "as I have made mention of their houses, it shall not be greatly from my purpose to describe

¹² While it is not unusual to find evidences of village sites situated inland, from necessity they rarely occur very far from fresh water, and are generally on the coast.

¹³ The early accounts generally state that the Caribs were painted by their women.

in what manner they were builded. They were made round like bells or round pavilions, their frame is raised of exceedingly [high] trees set close together and inserted in the ground, so standing aslope and bending inward that the top of the trees join together and bear one against another, having also within the house certain strong and short posts, which sustain the trees from falling. They cover them with the leaves of date[?] trees, and other trees strongly compact and hardened wherewith they make them close from wind and weather. To the short posts or props within the house they tie ropes of the cotton or gorsapine trees, or other ropes." . . . "At the entrance of one of the houses they found two wooden statues, with serpents wreathing round their feet, and they found looms, in which the natives wove a sort of carpet, and all kinds of earthen vessels."

The sites of these villages are now indicated by low mounds or middens, sections of which are often revealed by encroachments of the sea or by streams flowing near them.

As skeletons sometimes occur in these sites, reference to burial customs may be mentioned here. The ancient Antilleans buried their dead in a contracted (embryonic) posture, often in the floors of the houses; and we have an early record of a chief of Dominica who was buried in the middle of his dwelling, after which the house was abandoned. The natives were accustomed to make the grave in the same house where the person died, or in a new house built for that purpose. The dead were sometimes seated on their heels, the two elbows on the two knees, the head resting in the palms of the two hands. The author has found burials in the Carib cemetery at Banana Bay, in the island Balliceaux,¹⁴ in the same position as above described by Labat. It was customary to deposit mortuary offerings in the graves, which accounts for the pottery and other objects found by the author in the Balliceaux cemetery. The middens are commonly composed of thin layers of ashes with charcoal in which are scattered shells of mollusks, clams, pottery fragments, broken stone implements, and other objects of stone, shell or bone. These refuse heaps have shells scattered through them, but shells predominate only when the people who constructed them used mollusks for food, true shell heaps being composed almost entirely of shells, although containing rejects, as abandoned implements or utensils.

The author found a few true shell heaps in the Lesser Antilles,

¹⁴ After the Carib war in St. Vincent, the Black Caribs were first removed to this island and later transported to Roatan, off the north coast of Honduras.

but one at Erin Bay (near where Columbus landed) in Trinidad was large and yielded many objects similar, with the exception of the pottery, to those found in South America.

On a mound situated on a marl hill, supposed to be the site of a former village in the northern part of Barbados, there were broken fragments of pottery, and very little else, most of the mound, which was formerly a midden, having been largely washed away.

Artefacts. Artefacts, from the West Indian islands visited by the author, consist of stone implements, pottery, carved shell and bone and other objects. They have a marked difference, especially the stone implements, in different areas or groups of islands. There is not only a difference in the stone of which the implements are made, but also variations in their forms. This localization of stone implements was noticed especially in St. Vincent, St. Kitts, and Santa Cruz. Certain forms of implements, as the almond-shaped celts, are found throughout the whole extent of the Greater Antilles, Porto Rico, Haiti, and Eastern Cuba, where they constitute 90 per cent. of all the stone objects. These petaloid and almond-shaped stone implements occur almost universally in the Lesser Antilles from Santa Cruz to St. Vincent, becoming less abundant on the southern islands, where the proportion has dwindled to 10 per cent. or less. Here, on the other hand, the proportion of axes with blunt or winged heads, a form not occurring in the northern region, has increased to 90 per cent. of all the stone implements.

Pottery with handles in the form of bizarre heads occur from Porto Rico to Trinidad, appearing universally in all the islands.¹⁵ The pottery found in each group of islands is distinctive; that from Porto Rico, for example, differs from that of the volcanic islands, and the St. Kitts style is unlike that from Trinidad, the Grenadines or Barbados.

Pottery and basket making as now practiced by the natives of several of the Antilles are lineal descendants of Indian arts and often Indian names are retained by modern potters. At present the potter's wheel is not used and pottery is baked by modern natives in much the same way as by the Indians, several centuries ago. Wherever the clay is suitable, the potter's art is still practiced and fair products are now sold generally in some corners of the open market places. Not only has the art of pottery-making been transmitted by the aborigines but also prehistoric forms and decorations

¹⁵ At Nevis, for instance, the aboriginal styles and ornamentation are still preserved by the present natives.

have been preserved. Although the character of pottery and its decorations vary somewhat from island to island,¹⁶ our collections are not as yet ample to differentiate one from another. We find the prevailing colors are red and white and sometimes brown, but a glazed fragment has yet to be seen. The decorations are generally incised or in high relief.

The so-called "monkey" goblet, or vase with a tubular snout appended to one side, is a good example of a form lineally descended from an aboriginal pattern. Several prehistoric specimens of these, somewhat modified, are known from collections made in Barbados and St. Kitts. The handles are somewhat differently arranged from those on typically modern monkey vases, but the essential snout, resembling that of a modern teapot, is always present.¹⁷ The human face, heads of birds, and reptiles, especially the turtle,¹⁸ are constantly represented on handles and effigy vases from the Little Antilles.

A study of types of implements, stone or shell, and the variations in form and decoration of pottery have led the author to classify the aboriginal cultures of the Lesser Antilles as follows:

1. Barbados is culturally as well as geologically and, in a manner, biologically a distinct archeological culture area.

2. Prehistoric objects from Trinidad and Tobago archeologically resemble those from the north coast of South America.

3. The archeological objects from the volcanic islands from Grenada to the Anegada passage are divided into two groups, one of which is illustrated by the beautiful collection from St. Kitts, made by Mr. Connell; the other by numerous objects from St. Vincent. These indicate two cultural areas in this geographical area.

4. Santa Cruz and St. Thomas have cultural resemblances in their antiquities to the Porto Rican or Jamaican area.¹⁹

Carib Culture. The materials indicating the so-called Carib culture cannot be distinguished from those of the agricultural people of the volcanic islands of the Lesser Antilles, although their mentality is characteristic. The Caribs are regarded by the author as having originated from a preexisting agricultural people, who lived much the same as the agriculturalists from which they sprang; but

¹⁶ Bowls, vases and jars from Trinidad and the Grenadines have a raised base or appended ring which do not occur in the northern islands.

¹⁷ The author obtained from the natives of Nevis, who are fairly good potters and expose their wares for sale on the quay at St. Kitts on market days, a "monkey" vase almost identical with the aboriginal. The saucer of this vase, like the aboriginal, is ornamented with finger tips and both pieces closely resemble pottery found in middens of St. Kitts.

¹⁸ The frequency with which turtles and their heads occur on ancient pottery handles and effigy bowls suggests that this animal was widely worshipped, as it naturally would be, being a common food of the aboriginal people.

¹⁹ A close comparison of these areas can be shown only by technical descriptions and figures which are not practicable in this article.

they were great warriors and were hostile to their ancestors. Archeologically the objects belonging to them are not characteristic of Caribs as such, although each group of islands has a distinctive form of implement and characteristic pottery. Sir Everard F. im Thurn, relying in part on traditions to that effect, derives the Guiana Caribs from the insular. The South American Arawaks, he says, speak of incursions of Caribs from the islands, not from up the Orinoco River. According to Brett, the Warrau maiden, Korotona, gave birth to a being of human serpent form, who afterwards became the first Carib, thus making the Caribs descended from the Warrau. There is a tradition among the Arawak that the Carib tribe in former ages lived in the island to the north (Lesser Antilles).

Effect of Environment on Culture in the Lesser Antilles. The culture of man in the Lesser Antilles follows a general law and is largely the result of two causes, heredity and environment. Certain fundamental traits of culture that have possibly originated under other conditions have been modified or completely changed by the necessity of early ancestral colonists conforming to a new environment; others have not been changed owing to conservative tendencies and have remained more like those from which the race sprang. Among the latter traits may be mentioned languages, mythologies, and especially anatomical features. Among the mutable characters are those productions ordinarily indicated by the material culture. Roughly speaking, the volcanic islands were inhabited by Caribs, and, as these volcanoes were frequently in a state of activity, they were a constant menace and profoundly affected the culture of these people, often driving them to make inroads on islanders who were agriculturalists and had their homes on more stable islands. We know that, when circumstances or sociologic conditions change, insular men are driven to migrate from their homes into new lands beyond the seas and that these emigrants are naturally attracted to places where their former environment is most closely reproduced. This is one reason why there is a close relation between geographic environment, fauna, and flora of islands and human cultures. The migration of man is partly governed by the same laws as those governing animals and plants; but in casting about for a home, migratory man chooses, as far as possible, a habitat like that he has left; migrating animals and plants have not the choice, but they naturally survive under conditions like those they left in preference to new conditions to which they are not acclimated. It takes a long time and means changes amounting to specific differences, for a plant or animal to become acclimated, but man can

change his culture to meet the requirements of a new environment, although it also takes a long time for him to develop such cultural differences. Hence the difference in artefacts found in different islands of the Lesser Antilles indicates a long continued residence.

The stability of a non-volcanic island is conducive to a peaceful agricultural life rather than warlike mental tendencies. Under these conditions man has no incentive to raid his neighbor; but a volcanic island, with an eruption every three or four generations, develops and fosters the marauding spirit. As long as there was an incentive in physical conditions, due to volcanism, the inhabitants kept up warlike habits and marauding tendencies persisted.

Hurricanes, as well as volcanic disturbances, have often driven the so-called Caribs to raid other islands for food. Inigo (p. 120), in giving the results of the hurricane in Porto Rico in 1530, ascribes the failure of food in that year as the cause of a raid on Porto Rico of the Dominica Caribs under Jaurebò; and there is every reason to suppose that frequent raids took place in prehistoric times for the same reason that Jaurebo made this incursion.

A study of the Antillean culture shows that some of these islands have changed their physical conditions,²⁰ while inhabited by man, to such an extent as to affect the food supply at times and this economic change has led to migrations and consequent modifications in culture. A small island will support a population up to a certain number, but when that population increases beyond a limit several things may occur. First, the inhabitants may invent a new method of increasing the food supply that the island yields, or, second, a migration of the surplus population to other islands may take place, either in the form of colonization or predatory expeditions. The so-called "Carib islands" are as a rule volcanic, and these volcanoes have been so often active that their frequent eruptions became a menace to agriculturalists. Each eruption not only killed many natives but also, by covering the fields with ashes and lava, destroyed the food supply of many others. At the time of such a calamity the survivors were naturally forced to obtain a food supply elsewhere, which led them to raid the neighboring islands. Continued catastrophes, from generation to generation, may even have permanently modified the mentality of the inhabitants of volcanic islands, affording an instructive example of the psychic influence of environment. When a renegade band had overcome the inhabitants of one of the islands it obtained a footing

²⁰ The eruption of the Soufriere in St. Vincent in 1903 devastated the whole "Carib community" and almost blotted out the race in that island.

from which to make excursions to others, for plunder. As some of the smaller of these islands seemed to be depopulated by men, who were really absent on distant marauding excursions, it is natural to say, as some of the early explorers did, that they were inhabited by women only.

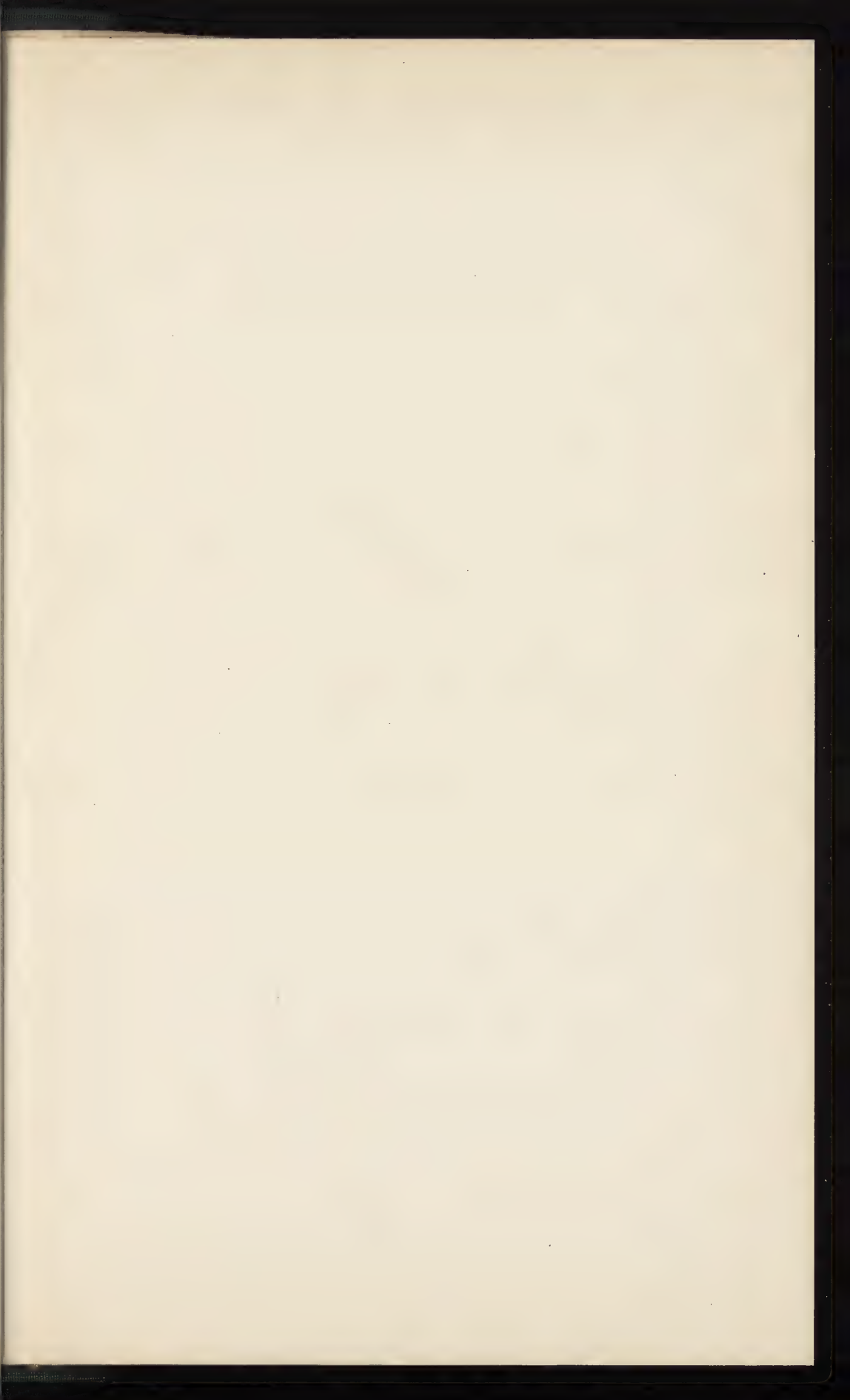
The agricultural people of the islands are probably those of whom Davies writes: "These Arouages then are the people whom our Islanders (Dominica Caribs?) go and find out in their own country, commonly twice a year, to be revenged on them as much as they can. And it is to be observed on the other side, that the Arouages never make any attempt on the Caribees of the Islands, in the islands where they live, but only stand on the defensive; whereas they are sure to have our savages among them oftener than they wish, coasting along, as they are wont to do, all the other islands wherein they have Gardens, or Colonies, though the furthestmost of the Caribby islands, which is Santa Cruz, is distant from the Country ²¹ of the Arouages about three hundred leagues."

The so-called insular and continental Caribs of South America are said to have linguistic similarities, but this likeness does not prove that the two have a close consanguinity. All depends on the relationship of the mothers or the women whom the Caribs in the two regions married and by whom they had children. We hear very little of them except that they spoke a different language from their lords and the probability is that they never spoke Carib. If so, their children are not Caribs but products of another stock. Marriage outside the race early gave rise to the union of African slaves wrecked on the island Bequia, and the yellow "Caribs" of St. Vincent. Although the inhabitants of Guadeloupe, Dominica, Martinique, and St. Vincent are preeminently called insular Caribs, they cannot be the same racially as the Caribs of the Orinoco, but both may be a modified type of mixed character, one of which was peculiar to the islands where they were evolved; the other to South America, but belonging to a related linguistic stock.

Man does not, as a rule, migrate from a home in which he has become acclimated simply for a change, but is generally driven by scarcity of food to seek a home where conditions are like those which he has left. This food quest and the desire to better their condition are the most potent causes that have impelled men to migrate.

²¹ The country of the Arawak here referred to may be Cuba, Porto Rico, Haiti, or South America.







POTTERY FROM CERTAIN CAVES IN EASTERN SANTO DOMINGO, WEST INDIES

By THEODOOR DE BOOY

IT was the privilege of the author to conduct certain archeological investigations in the Republic of Santo Domingo during the months of July to October, 1913, in behalf of the Heye Museum of New York City. This expedition confined itself mainly to the eastern part of the Republic, with headquarters first on Saona island and later in the woods near Cape Macao, in the vicinity of a small settlement called Salado (fig. 12).

Both Saona island and the district of Macao are virtually a virgin field to the archeologist. In the numerous general accounts and the comparatively few archeological writings on the island of Santo Domingo the author was able to find only a single mention bearing on the antiquities of the region. This is in a paper by Sir Robert Schomburgk, who makes brief reference to the shell-heaps of Cape Engaño, a promontory south of Cape Macao,¹ but does not state whether he made further investigation.

EARLY HISTORY

While information respecting the archeology of these regions is meager, one can find in early historical writings a certain amount of data on Saona island, the district of Macao, and in general on the eastern portion of Santo Domingo.

After Columbus had coasted the southern side of Jamaica on his second voyage, he steered eastward and soon saw the coast of Haiti rising above the horizon. He did not know which island this was, as he was familiar only with its northern coast, but on skirting the southern coast he found that he had returned to Hispaniola, when an Indian came off in a canoe to his ship, hailed him by name, and spoke to him in Castilian.² The Admiral continued eastward

¹ Schomburgk, *Ethnological Researches in St. Domingo, Report of British Association for 1851*, pp. 90-91.

² Irving, *Life of Columbus*, book VII, chap. vii.

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along the coast, and, passing the islands of Beata and Alto Velo, finally reached Saona and anchored in the channel between that isle and the mainland. Saona was called *Adamano*, or *Adamaney*, by the natives.¹ No mention is made by historians whether or not Saona was found to have inhabitants when Columbus was lying in the channel between it and the mainland, and the author can find no mention of the origin of its present name, Herrera merely men-



FIG. 12.—Map of eastern Santo Domingo, showing the route traversed.

tioning that the Castilians thus called² it, while Las Casas thought the name *Saona* was applied to it by the Admiral or the Adelantado, but does not give the reason.³ In Irving's *Life and Voyages of Christopher Columbus*,⁴ we find the following statement: "He [Signor Belloro] states that a public square in that city bore the name of Platea Columbi, towards the end of the 14th century: that

¹ Herrera, *Historia General de las Indias*, dec. I, lib. II, cap. xv. Las Casas, *Hist. Ind.*, lib. I, cap. xcvi.

² Herrera, *op. cit.*

³ Las Casas, *op. cit.*

⁴ Appendix, note VI, "The Birthplace of Columbus."

the Ligurian government gave the name of *Jurisdizione di Colombu* to that district of the republic, under the persuasion that the great navigator was a native of Savona, and that Columbus gave the name of Saona to a little island adjacent to Hispaniola, among his earliest discoveries." This, then, may be the origin of the name of the island, for while Irving says that the proofs which Signor Belloro brings forward to show that the Admiral was born in Savona are fallacious, he does state that the records show that the father of Columbus was for a long time resident of the town named. It may therefore well be that Columbus named the island in memory of his father.

We next find in the ancient chronicles that Saona was frequently visited after the establishment of the city of Santo Domingo on the southern coast of Haiti, and that the inhabitants of this settlement held constant communication with the natives of the island in order to obtain cassava bread. These relations appear to have been friendly for some time, and the aborigines of Saona readily supplied their visitors with provisions.¹ Owing to the customary Spanish cruelty, however, this condition of affairs did not last long. On one occasion a party of Spaniards came to Saona in a shallop and were well received as usual. It so happened, however, that one of the bloodhounds which accompanied the soldiers saw the cacique of the island moving about with a staff in his hand, directing the activities of his followers who were loading the Spanish vessel. The dog, under the impression that the cacique was making threatening motions, strained at his leash, and the Spaniard holding the animal, thinking to have some sport, released the hound, which forthwith sprang at the chieftain and killed him. The enraged followers fell upon the Spaniards and killed eight of them before the remainder could escape to their boat.²

This occurrence being reported in the city of Santo Domingo, orders were given to Don Juan de Esquibel (who at the time was about to undertake an expedition of conquest against the inhabitants of the Higüey district, to whose chief cacique, Cotubanama, the cacique of Saona owed allegiance) to make a special

¹ Las Casas, *op. cit.*, lib. II, cap. vii.

² *Ibid.*

trip to Saona in order to avenge the death of the eight Spaniards. Esquibel had with him a party of about 350 men, some of whom were sent to Saona.¹

The scenes following the landing of this expedition baffle description. The Indians, on discovering the hostile intentions of the invaders, gave battle, but to no avail: their arms were of small use against the cuirasses of the Spaniards, and their stone weapons no match for the swords and spears of their enemies. After great slaughter the surviving Indians retreated to the hills and caverns, but even here they were pursued, and Las Casas mentions that about 600 or 700 of them were found in one place and put to the sword. We must here make allowance for the historian, as it is not likely that so many Indians lived on Saona island or that they were found in one "casa" (house), as related by Las Casas, who received his information from hearsay and probably was misinformed respecting the number of Indians mentioned. Nevertheless, after this expedition no aborigines remained on Saona; such as were not killed were taken as slaves and the island depopulated.²

The early writers make one more mention of Saona island. After the second war on the inhabitants of Higüey, Cotubanama, the cacique of that district, fled to Saona with his wife and children and a few followers, who hid themselves in some caves in the interior.³ Another expedition was sent to capture Cotubanama, and he was finally made prisoner and taken to Santo Domingo City, where he was hanged by order of Ovando.⁴

From all accounts Saona appears not to have been inhabited after the massacre of its native inhabitants about 1502. The author has been able to find only one account to the contrary; this is in a modern work by Samuel Hazard, but no original authority can be found in support of his statement.⁵ This author says: "The course of the steamer being now entirely changed, she heads almost due west, and we pass the island of Saona, once famous in the annals

¹ Las Casas, *Hist. Ind.*, lib. II, cap. viii.

² Ibid.

³ Ibid., cap. xvii.

⁴ Ibid., cap. xviii.

⁵ Samuel Hazard, *Santo Domingo, Past and Present: with a glance at Hayti*, New York, 1873, p. 207.

of the Jesuits as a place where they held exclusive control over fertile fields. It is as large as the Dutch island of Curacoa and said to be infinitely more fertile, though now desolate and unproductive." It cannot be urged that Mr Hazard may have meant that the period of "exclusive control over fertile fields" antedated the massacre of the Indians, as the Jesuit order was not established in Europe until 1534, whereas the massacre of Saona took place about 1502; and even if the Jesuits had settled on the island in later years, some traces of their occupancy, such as the walls of houses or the walls surrounding fields, would be visible. While the present writer did not visit the western portion of the island, he saw no evidence of such occupancy in the eastern half. Several fishermen from the village of Bayajibe, on the adjacent mainland, assured him that they had often walked through the interior of western Saona and along its shores, but had never seen any remains of buildings.

The history of the district of Macao and Higüey is essentially the same as that of the island of Saona, so far as the aboriginal inhabitants are concerned. Bloodshed, rapine, and wanton destruction of agricultural property, the main resource of a non-mineral country like the district of Macao, mark the brief period of existence of the Indians after the Spanish invasion. When the Spaniards established their rule on Haiti, the eastern portion of the island was known by the Indian name of Higüey and was ruled by the powerful cacique Cotubanama. The inhabitants of this province were the most warlike of the island, having become proficient in the use of defensive weapons¹ probably through the frequent invasions of the Caribs from the neighboring islands to the eastward. The cacique himself has been described by Las Casas, who refers to him as the strongest and tallest man of his tribe; that his bow was so strong that a common man could not bend it, and that his other weapons resembled those of a giant.¹

About the time of the killing of the eight Spaniards by the inhabitants of Saona, the Indians of Higüey province, under the leadership of Cotubanama, revolted against Spanish rule. Their relations with the invaders had already become strained, owing

¹ Las Casas, *Hist. Ind.*, libro II, cap. xvi.

to the demands made upon them; and for some time they had been aware that their first conception that the Spaniards were supernatural beings was a delusion. A Spanish officer, Juan de Esquibel, was dispatched by Ovando from Santo Domingo City in 1504 to punish the natives, and after a few insignificant defeats Esquibel succeeded in driving the Indians to the mountains; but the luckless people were doggedly pursued and systematically killed whenever discovered.¹ Finally, in desperation, the natives sued for peace, which was granted them on harsh terms: they were to cultivate land for the invaders and pay tribute in provisions. Esquibel built a wooden fort in an Indian village near the sea, probably where now is the pueblo of Higüey, and left in it a guard of nine men under Captain Martín de Villaman, who was supposed to collect the tribute and to enforce the cultivation of the land.

This peace was of short duration. The resident Spaniards of Higüey, following the usual practice, treated the Indians with great cruelty, made demands on them to which they could not accede, while women were taken from their husbands and fathers, and abused. Driven to desperation the Indians rose against the Spaniards, set fire to the fort, and killed the defenders.² This revolt forced the Spanish governor to organize another expedition against the natives, again under the command of Esquibel.

Las Casas, then a young man of twenty-eight, was a witness of the greater part of this second campaign, and while it was not until twenty-five years later that he commenced to write his history of the West Indies, a work which was not finished until he was eighty-five years of age, the cruelties of this campaign made such a vivid impression on him that oftentimes he thought the scenes he witnessed were the result of an unhappy dream. It is not necessary here to recount the atrocities committed by the conquerors: the murder of women and children, the burnings at the stake and other revolting tortures committed by the Spaniards on a people that had every right to defend their native soil. The entire population of Higüey was exterminated, with the exception of the chief Cotubanama, his wife, children, and a few retainers, of whose fate we have already

¹ Las Casas, *Hist. Ind.*, libro II, cap. viii.

² *Ibid.*, cap. xv.

learned. Nor is it the purpose to discuss at greater length the history of the primitive inhabitants of this region, but merely to point out such connection as existed between Saona island, Higüey, and the district of Macao, which localities were undoubtedly inhabited by people of one tribe. The early accounts of these regions are of great interest to students of the history of early Spanish settlements in the New World, and it would be difficult to find in all history anything like the atrocious means by which the complete annihilation of the aborigines of the West Indies was effected.

SAONA ISLAND AND ITS ARCHEOLOGY

The island of Saona was surveyed in 1902 by the staff of the U. S. gunboat *Dolphin*, under Lieutenant-Commander Albert Gleaves, and an excellent chart (Hydrographic Office chart 2106), embodying the results of the survey, was published. At the present time the island is uninhabited; but this is not to be wondered at, inasmuch as it is not fertile, it is the resort of an unbelievable number of insects, and its eastern part is completely devoid of

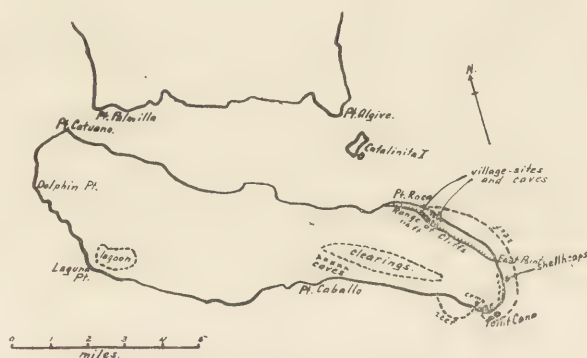


FIG. 13.—Map of Saona Island.

potable water. The author was told by fishermen who occasionally visit the island in order to find shelter for a night or to salt and sundry their catch, that in the western portion of Saona can be found a few wells, but that the water is almost undrinkable on account of the lime contained in it.

From San Pedro de Macoris, on the mainland, the author, accompanied by William Godet, a Turks Islander who accompanied

the expedition in the capacity of handy-man, proceeded to the small fishing village of Bayajibe where a sailing vessel was chartered to take the party to a point on the southern coast of Saona, one mile to the westward of Point Cana (fig. 13). This is one of the few spots suitable for pitching a tent and establishing camp. There is a brackish lagoon within half a mile of the shore, and there is also a well the water of which can be drunk in case of absolute need. This also is the nearest available camping spot to the eastern coast of



FIG. 14.—Sandy southern coast of Saona.

Saona. The entire southern coast has a sandy beach (fig. 14), while the entire eastern and northern coasts are of a coral formation (fig. 15) on which one can neither effect a landing nor erect a tent, there being neither trees of any size, nor soil. The author and his helper remained on the island sixteen days, during which time the chartered vessel called twice with a supply of drinking water.

The necessities of life which one finds on Saona are few, an occasional wild pigeon and a fish or two being the only articles of food that were not imported. But while food is scarce on Saona,

so much cannot be said of animal pests, mosquitoes, sandflies, centipedes, scorpions, and a particularly vicious variety of wasp being found in great numbers on the beach and in the interior. At times mosquitoes and sandflies especially were so bad that it was impossible to enter the bush on the southern side of the island. Fortunately the greater part of the work to be done was in the neighborhood of Point Roca, where hardly any of these pests were to be found; perhaps it was for this reason that the aborigines had



FIG. 15.—Typical coral formation on eastern coast of Saona.

their villages around Point Roca, and that they merely visited other localities to cultivate their crops, to build and keep their canoes, and to dive for conchs, an important article of food. It was often necessary for our little party to retire before sunset and not to get up until an hour after dawn, a trying ordeal when one considers that sleeping under a cheese-cloth canopy, in order to keep out the tiny sandflies, has much the effect of a Turkish bath. It was not possible to transport the tent and the rest of the camp outfit to Point Roca through the dense brush and over the honeycomb coral,

and as there is no landing place on the eastern coast of the island, transportation by boat is out of the question.

Saona is 12 miles long and 3 miles wide, at the widest point, with an area of about 25 square miles. The rocky parts of the coast consist of the characteristic honeycomb coral, but the southern coast is chiefly a gently-sloping sandy shore. The greater part of the southern and eastern coasts is bounded by barrier reefs which are continually building up and forming new land. The bush on the eastern part of Saona is that characteristic of all West Indian coral islands, but the geological structure of Saona is different from that of the mainland, and is not unlike the Bahama islands. A great deal of the shrub consists of buttonwood, and there are also quantities of candelabra cactus and a species of small mahogany tree. The western part of the island is densely wooded, and there are said to be some valuable hardwood trees there. The interior of the eastern coast of Saona exhibits a remarkable phenomenon: the core of the island, some 116 feet high, has evidently been suddenly pushed upward by two distinct marine upheavals in pre-æolian times, and, as a result, in the top of the cliffs at Point Roca one finds caves formed by the action of the waves at a period when the core of island protruded only about ten feet above sea-level. After the first upheaval, other caves were formed in the base of the rocks, now about a hundred feet above the sea, when a second upheaval forced the core of the island upward another ten feet and

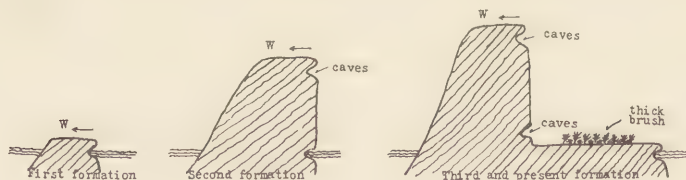


FIG. —Eastern coast of Saona at different geological epochs.

formed the plateau now found between the high rocks at Point Roca and the sea (fig. 16). It was in this second range of caves, at the foot of the high cliffs, that abundant evidence of former aboriginal occupancy in the way of sherds, broken stone implements, etc., was found. It was necessary to blaze a way through the dense brush from the coast to the foot of the cliffs, a distance varying from half a mile to a mile.

One also finds on Saona, on a small bluff half a mile inland from the eastern coast, at East Point (see the map, fig. 13), the ancient foundation of a lighthouse that was never completed; the foundation is in good repair and could be used for a much-needed lighthouse to protect vessels coasting the shores of the Dominican Republic. No information regarding the structure could be gleaned from fisherman, but it is not unlikely that the work may have been commenced on the recommendation of Sir Robert Schomburgk, who made an extensive geographical survey of Santo Domingo in 1850-52.

The author made daily trips from the camp near Point Cana to points along the eastern coast, but during the first three days' sojourn on the island was unable to find any indication of former aboriginal occupancy, with the exception of scattered conch-shells with typical Indian perforations. In determining, throughout the West Indies, whether the aborigines had visited certain localities, the author has been greatly aided by an examination of old conch-shells (*Strombus gigas*) lying about. One often finds these shells in the interior of an island, sometimes as much as five or six miles from the sea; then again small heaps of the shells have been found on the coast, and they have been seen also in caves. Frequently the semi-fossilized condition of the shells indicates that they were opened in pre-Columbian times, but where the original pink coloring is preserved it is evident that they were taken from the sea at a comparatively recent date. There is one way, however, by which one can determine with certainty whether the shell was opened by a prehistoric or a post-Columbian inhabitant, and that is the condition of the aperture by means of which the conch was loosened from its shell and the meat extracted. If the aperture is a small round one (fig. 17), it is certain that the conch was opened and used by an Indian. The author has asked many West-Indians how the conch could have been taken from its shell in this way, as the hole is far too small to admit the introduction of an instrument like a knife to loosen the muscle from the inner convolutions. The modern conch-fisher makes either an elongate orifice in the shell of the type shown in figure 18, and then with a knife-blade loosens the muscle, or else with a hatchet knocks off the entire top of the

shell. After the muscle has been cut loose, the soft conch can be pulled through the mouth of the shell. No negro conch-fisher with whom the writer has ever talked, could explain how an Indian could have extracted a conch by making merely a small round hole, hence the process can be explained only by the theory that the pre-Columbian inhabitant caused the conch to release its hold on the shell by pouring boiling water in the aperture. Whatever the value of this conjecture, it is a fact that the difference in the apertures is an important guide in determining where the aborigines lived, and has proved of great value in our West-Indian explorations.



FIG. 17.—Conch-shell opened by an aborigine.



FIG. 18.—Conch-shell opened by a modern negro conch-fisher.

From Cuidado reef, at the extreme southeastern point of Saona, to a point half-way to the inland bluff called East Point, a distance of about a mile, one encounters, at no great distance from the sea, small heaps of conch-shells, and as no indications of an Indian village-site in the immediate vicinity is found, it is evident that the Indians came to this spot only to collect the conchs on the rocky shoals between the reefs and the beach, then to extract the meat from the shells, and to carry it, possibly after salting, to their habitations. Extensive excavations in some of these small heaps of shells mixed with brain coral (fig. 19) failed to produce potsherds or other artifacts.

The explorations were extended day by day farther to the north along the eastern coast, when finally, in cutting a path through the brush almost due west from a point on the beach about half a mile from Point Roca, we found, at the very foot of the cliff, a large quantity of potsherds and some fractured stone celts (figs. 20, 21).



FIG. 19.—Deposit of conchs and brain coral.

As above stated, the cliffs at Point Roca, at a distance of half a mile to a mile from the shore, rise perpendicularly from a plateau about ten feet above sea-level and which is densely covered with brush through which one has to cut his way with a machete. The survey map above mentioned gives the actual height of Point Roca as 116 feet above sea-level. The cliff slopes gradually to the southward and still attains a height of about 100 feet at a distance of two miles from the northeasterly extremity of Saona. It is impossible to scale these cliffs directly at Point Roca, but half a mile from Point Roca, ascent is possible, though dangerous and difficult. The limestone is greatly weathered, and the rough surface, combined

with the small cacti which have found a hold on the almost sheer face of the cliffs, makes climbing an unpleasant task. No evidences of Indian occupancy were found on the high plateau; but this lack is not to be wondered at, since the vegetation is almost impenetrable and the rock formation such that walking is impossible. At the foot of the cliffs are a great many shallow caves, or, rather, overhanging shelves of rock. Caves are found also at the top of the cliff, but these are not accessible. After climbing the cliff, the author



FIG. 20.—Dense brush between beach and inland cliffs.

attempted to descend into one or two of these caves with the aid of a rope, but as this was found to be impossible, the theory that the upper range of caves was used by the aborigines for any purpose may be dismissed as untenable.

Potsherds, chiefly fragments of cooking vessels, were found in several of the caves at the foot of the cliffs, but nothing was found to prove that these shelters were used for habitation, for burials, or as shrines. The sherds found here may be parts of

vessels left in the caves to collect water from the drip of stalactites. As previously mentioned, a large quantity of sherds was found at the foot of the cliffs outside of the caves, over an area of about two miles in length and about fifty yards in width. It might therefore well be that the aborigines had a village at the foot of the rocks and stationed sentinels on the summit to guard against invasion by enemies, and that in case of severe storms the inhabitants sought shelter in the numerous caves and under the shelving rocks.



FIG. 21.—Foot of inland cliffs and caves.

It cannot be said that the inhabitants of Saona were troglodytes, principally because in the caves explored in the interior of Saona, no indication of Indian occupancy could be found. One of the most noteworthy finds among the potsherds collected along the base of the range of cliffs was a new type of neck of a water vessel, subsequently found in large numbers in the caves of the Macao district. This sherd possibly indicates that the aborigines of Saona were in the habit of going to some inland well for their drinking water,

since no potable water can be found within a radius of three miles from Point Roca, unless one excepts the drip, negligible in quantity, from the cliffs and the stalactites. It may also be stated that practically no shells were found in the area where the potsherds occurred, and that twelve broken petaloid celts were collected, of the usual Antillean type, but no entire ones were found.

No kitchen-middens were met with on the eastern part of Saona, but this condition is not unusual on these soilless coral islands. It is possible, however, that one might find middens and village-sites on the western half of Saona, because the presence there of large trees would indicate a supply of soil that preserves the hummocks upon which the Indian habitations were built and their accompanying refuse-heaps accumulated. It is hoped that further researches in the western part of Saona will be conducted.

Another village-site was found due east from the site under the rocks, within 20 yards of the shore. While not covering so extensive an area as the first site, a large quantity of sherds was collected, notably a number of the typical pottery heads of the general region.

Extended explorations were conducted also to the westward from the camp at Point Roca, especially in the interior and through the brush. The author was guided to some inland caves by visiting fishermen, but could find no remains in any of these.

While it is not desirable to theorize on the means employed by the Indians to protect themselves against the insect life found on Saona, one can picture the mode of life of its early inhabitants. It is known that their principal settlement can have been at no other place than the foot of the cliffs of Point Roca, judging from the occurrence of the large number of potsherds there; that they went along the shore to the southward to collect conchs, their chief food staple, and that undoubtedly they also caught fish on the shoals surrounding this part of the island. They doubtless stored their canoes on the southern beach, the only place where they could have effected a landing, as previously mentioned. There is no question that the Indians went to the interior to cultivate cassava and other vegetables, as this was not possible in either the rocky ground of the eastern coast or the sandy soil of the south. It may also be said that at practically all seasons the aborigines were prevented

from living in the interior, on the southern coast, and on such parts of the eastern coast as provided their supply of sea-food, owing to the innumerable mosquitoes and sandflies. These conditions, therefore, may have led to the selection of Point Roca as the most suitable abode, since this point is exposed to the southerly, easterly, and northerly winds (as may be known, there is no westerly wind ten times a year in the Antilles), and where in consequence mosquitoes are scarce and sandflies not found at all.

Whether or not the *utia* (*Capromys*) ever existed on this island is not known, but from the fact that skeletal remains of this animal were found in the kitchen-middens of the mainland, at Point Barbara, it is probable that it occurred also on Saona, although no bones were found on that island, possibly due to lack of soil. There are three species of non-venomous snakes on Saona.

In concluding this short report of investigations on Saona, it may be said that it is practically impossible to remain on this island for a considerable time without danger of serious illness from the stings of insects. In consequence it was deemed best to conclude the Saona work and to be contented, for the time being, with the exploration of the eastern half of the island, trusting at some future time to be able to explore the western portion by means of a vessel which at night could anchor far enough off-shore to be out of range of mosquitoes and sandflies. It will also be noted that in a later part of this paper no mention is made, nor illustrations given, of the potsherds collected on Saona. This is for the reason that in the explorations at Cape Macao so many sherds of similar type, but in better state of preservation and of larger size, were found, that the illustration and description of these apply to the Saona specimens as well.

INVESTIGATIONS NEAR SALADO AND CAPE MACAO

After leaving Saona, the author returned by the chartered sailing vessel to the fishing village of Bayajibe, where a pack-train was hired to conduct the party and its equipment to the pueblo of Higüey in the interior. From Higüey the author continued across the island to the cacao plantation of Mr F. Goussard, a French settler in this district, who generously placed his house at the disposal of the expedition. Mr Goussard's plantation is near Salado,

on the Anamuya river, about four miles from Cape Macao on the coast. While this gentleman was not residing on his property at the time, the author was fortunate in finding there Major Daniel Tenaille, a young Frenchman who had bought land in the neighborhood and who was stopping at Mr Goussard's plantation. The author takes this opportunity to extend his thanks both to Mr Goussard and to Major Tenaille for their hospitality and many courtesies during his stay in Santo Domingo, especially to Major Tenaille for the specimens found on his property and given by him to the Heye Museum.

The party spent three weeks at the house of Mr Goussard, and a similar period on the plantation of Major Tenaille. During this time we were enabled to explore thoroughly the Macao district and to conduct excavations at various sites. The usual mode of travel was on horseback, and comparatively good horses could be obtained for this purpose.

On Major Tenaille's plantation and the adjacent property it was our good fortune to find several caves which evidently had remained undisturbed since the annihilation of the aboriginal inhabitants. These caves are found in the midst of a virgin forest, within an area of a square mile (fig. 22). There can be no doubt that all these caves would be found to communicate, if one cared to open the tunnels which at present are too small to allow the passage of a human body. In the accompanying photograph (pl. IV, *a, b*) are shown the mouth and the interior of the first chamber of one of these caves. In all, eight caves were found, the openings sometimes being hidden in the dense forest, making it difficult to relocate them after they had once been left. Pottery was found in all these caves.

The caves explored are in the typical limestone formation of the West Indies. Two of them are quite large, and contain underground lakes of fresh water. It was in these two caves that the greater part of the pottery was found. Practically all of this earthenware was broken, due in part to the falling of slabs of limestone from the roof, and partly from having been thrown about by the original occupants; for example, in two instances parts of a vessel were found separated by a distance of ten yards or more.





a. Mouth of Cave



b. Interior of Cave

THE CAVES NEAR SALADO

There is every reason to believe that these caves had not been entered since the advent of the Spaniards, as they open on land that had been cleared only after Major Tenaille bought the property, and even then it was impossible to persuade the Dominicans of the laboring class to enter the caves unless accompanied by either

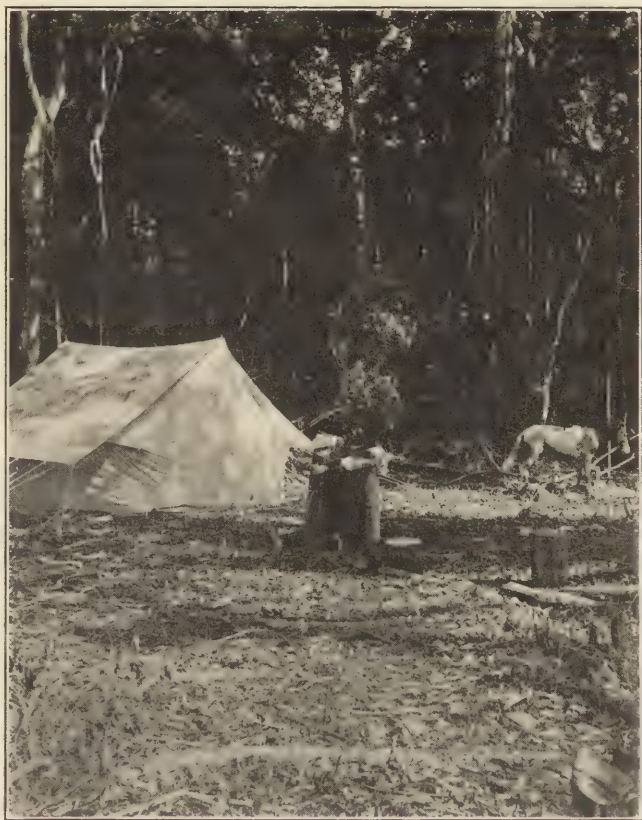


FIG. 22.—Camp near Salado, in the neighborhood of the caves.

Major Tenaille or the writer. In the two caves with the underground lakes a great many potsherds were lying in the water, some of which were recovered by diving on the part of Major Tenaille, the author, and Godet, our colored helper. A fragment in the lake bottom, in some places twelve feet in depth, was first located by burning a piece of magnesium wire; a long pole was then put in the

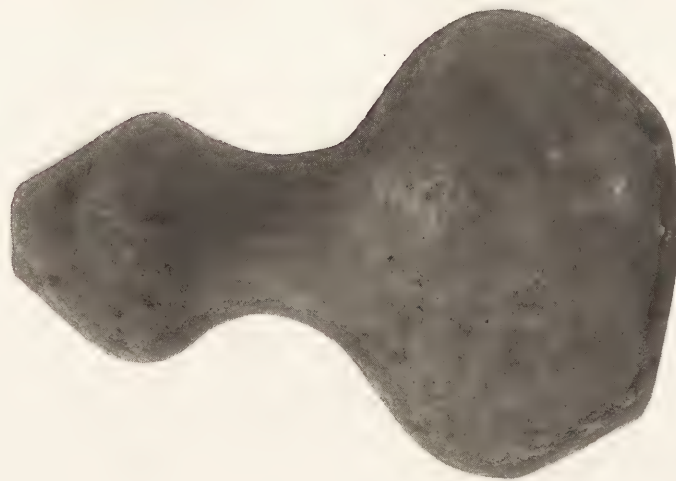
water alongside the sherds, and the diver, following the pole with one hand, recovered the pottery with the other.

Most of the sherds found were lying between the boulders that cover the floor of the caves, and which, in the course of centuries, had fallen from the roof. Between these boulders are small chambers and tunnels, making the thorough exploration of a cave a tedious task of several days. One cave especially was hard to explore, owing to the dense air in the bottom which made breathing difficult. The entrance of this cave has a downward slope of about forty-five degrees, and the lakelet at the bottom is not less than thirty feet lower than the mouth.

Chemical analysis of water from the cave lakes, made by Dr Frederick W. Zons, to whom the author wishes to acknowledge his indebtedness, indicates 975 parts per million of mineral matter, of which 550 parts are sulphates, and 216 parts oxide of lime present chiefly as sulphates. The mineral matter contains, in addition, considerable sodium sulphate and chloride, also 36 parts per million of iron and aluminium oxides, and 33 parts per million of silica (SiO_2). The water contains also 1010 parts per million of organic matter, but this of course may be of recent origin. The water is extremely unpalatable, and the author drank it only when his supply of rainwater was exhausted. The horses and mules refused to drink it, even after they had been without water for two days.

As has been said, the area in which these caves are found does not exceed a square mile. Taking this area as the limit of investigation, the author attempted to find the exact location of the Indian village-site, which presumably was within a short distance of the water supply. While odd fragments of pottery were found in the undergrowth within a radius of two miles of the caves, in no instance were they discovered in sufficient quantity to enable the exact determination of a former settlement, hence it cannot be said definitely that the Indians had a permanent abode in this vicinity. Furthermore, in view of the quality of the cave water, and the fact that typical village-sites and kitchen-middens are not found along the coast within a distance of eight miles from the caves, it is probable that the aborigines came to these parts only in the planting season, during which time they lived in temporary shelters.





a. Water Vessel



b. Part of an Effigy Vessel

EARTHENWARE FROM THE SALADO CAVES

The month of April, 1914, was likewise spent in the Macao district, with headquarters in the new house of Major and Mrs Tenaille, by whom the author was hospitably entertained. As in the case of the first expedition, much of the success of the second visit to this region was due to Major Tenaille, who had obtained from the natives much valuable information for the use of the author in the interim of his two expeditions. The caves were again visited, and a new range of caves was explored in the Peñon de la Vieja Rufina, near Cape Engaño. The Bonao district was also reconnoitered with the view of future work in the inland district.

DESCRIPTION OF THE POTTERY

Perhaps the most interesting potsherd from the Salado caves is the top of a water vessel seemingly designed to serve as a filter. This fragment was found among the boulders covering the sloping floor of one of the caves, and on careful examination several large pieces of charcoal were found in proximity to the sherd. Figure 23 shows the fragment in an upright position, while figure 24 pictures



FIG. 23.—Top of "filter jar."



FIG. 24.—Bottom view of "filter jar."

the bottom of the specimen. In the latter illustration the "filter disk" can plainly be seen, dividing the upper part of the vessel from the lower, and figure 25 illustrates the probable appearance of the original vessel and the use to which it was put. The author

knows of no other specimen of this type, with the exception of one, also from the Salado caves and kindly presented by Major Tenaille to the Heye Museum; it consists only of the disk of a "filter jar," with the perforations, but shows clearly that it is of the same type as the specimen illustrated. The author considers it

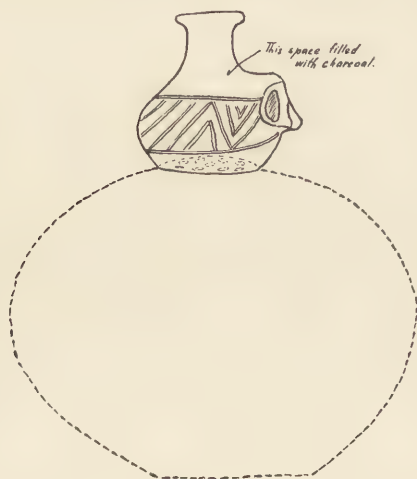


FIG. 25.—Probable outline of "filter jar."

lines ornamenting the body and a conventionalized parrot-head serving to decorate one side. Height of specimen, $4\frac{1}{8}$ inches (10.5 cm.).

What must originally have been a well-constructed effigy vase is shown in plate v, *b*. Unfortunately the remainder of this excellent vessel was not found, otherwise it would rank as one of the most remarkable vessels from the West Indies. It is more than probable that the bottom part of this vase was globular and that it joined the effigy at the remaining edge of the under side. This vessel, which is of dark-brown clay, is of good workmanship and excellent finish. The details of the head are well executed, the nose, nostrils, eyes, and mouth being prominently shown, while the ears are fashioned in a conventionalized manner with incised circles. There is a slightly elevated ridge on the crown of the head, surrounding a circular opening which served for filling and emptying the contents. The upper part of the body, below the neck, is decorated with an

remarkable that the aborigines of Santo Domingo should have known the principle of filtering water through charcoal. It is difficult, however, to conceive what good it did the pre-Columbian inhabitants of Salado to filter their water through charcoal in this manner, as this process would not remove the lime, and the cave water does not contain other impurities necessitating its employment. The sherd illustrated is of yellow-brown clay, with a band of incised





WATER VESSELS FROM THE SALADO CAVES

intricate, symmetrical, geometrical design which reminds one of that seen on the backs of wooden stools (*duhos*) found in certain parts of the Antilles, especially on the Caicos islands and the Bahamas.¹ Height of specimen, 7 inches (17.8 cm.).

One of the few entire vessels found in the Salado caves is shown in plate VI, *a*; it is of reddish-brown clay, is well finished, and in an excellent state of preservation, having only one small hole in the side. It was probably on account of this hole that the aboriginal owner discarded the water-jar, and, instead of breaking it to pieces, as appears generally to have been done, it was deposited between boulders, where it was found by our party. The lower portion of this vessel, when found, was somewhat incrustated with a calcareous deposit, occasioned by the drip of the limewater from the roof of the cave. The top part of the neck of this vessel has a somewhat conical enlargement; the lower part is decorated with a grotesque head which, judging from the sunken eyes, may have been intended to represent a monkey, a not unusual feature of decoration in Antillean pottery. Eyes, nose, nostrils, and mouth are clearly shown by deep, incised lines and circles, and the top of the head is covered by a raised, cylindrical ornament with incised decoration. The ears appear to be divided into halves, with a deep pit in each half. On the reverse side of this lower portion of the neck of the vessel can be seen a convolute design in high relief, probably representing a snake. Two parallel incised lines surround the base of that portion of the vessel where the neck merges into the globular body: these lines are half an inch apart, and the space between is divided into four equal parts by four rectangular lines joining the two circles. In each of the four spaces thus formed, the potter cut another line parallel with the two circles and at an equal distance between them. This line in each case is almost a quadrant, and terminates at each extremity in a shallow pit made with the instrument with which the incised line was cut. Height of specimen, 14 inches (35.6 cm.).

The three necks shown in plate VII, *a*, *b*, *c*, belong to the same type of vessels as that illustrated in plate VI, *a*, and show varied ornamentation.

¹ Otis T. Mason, "The Guesde Collection of Antiquities in Pointe-a-Pitre, Guadeloupe, West Indies," *Smithsonian Report for 1884*, fig. 202d, p. 828.



Figure 26 illustrates another highly decorated neck, with straight-line and circular incisions, and two conventionalized heads. The spout of this vessel terminates in a somewhat conical enlargement, like that of plate VI, *a*. Height of specimen, 7 inches (17.8 cm.).

Another type of jar was found, having a large flaring spout upon a gourd-shape body. In many instances this form of spout is provided with two handles, giving the jar a classical appearance not found in other West Indian water vessels. Two specimens are shown in plate VIII, *e*, *f*. Specimen *e* has the usual conventionalized heads which served as handles, and incised lines forming a decorative band between them. Height of specimen, 4 inches (10.2 cm.). Figure *f* originally had two handles, broad and flat, joining the body of the vessel and curving over, forming a junction with the neck, and continuing around the latter in a raised band. This type of handle appears to be new in Antillean pottery. Height of specimen, 4 inches (10.2 cm.).



FIG. 26.—Neck of water vessel from Salado caves.

Two other entire vessels, besides the one shown in plate VI, *a*, were recovered from the Salado caves. One of these (pl. V, *a*) is the simplest form of the double-gourd type of water-jar and lacks even the most elementary form of ornamentation. The body of the vessel is globular, narrowing into a neck superimposed by a conical spout. This specimen is of dark-brown clay of a poor quality, and is 8 inches (20.3 cm.) in height. The other vessel (pl. VI, *b*) was recovered, by diving, from the lake in one of the caves. When first seen in the water, the vessel was entire, possibly having slipped out of an Indian's hand while being filled with water. On coming to the surface with the vessel, the diver accidentally struck it against a projecting rock, breaking it, but the missing part was

recovered after further diving. The jar was in an extremely poor condition from long soaking, and showed a tendency to crumble at the slightest touch. Despite every precaution in packing, the specimen arrived broken into about fifty pieces. It was, however, finally mended and now ranks as an important accession to the Santo Domingo collections. This vessel, which is of yellow clay, has a flask-shaped body; the neck is ornamented with two small lugs. Height of specimen, 9 inches (22.9 cm.).

The author collected a few fragments of vessels of the *mammæ* type described by Dr Fewkes,¹ but was not fortunate enough to be able to procure an entire specimen of this shape. Plate VII, *d*, shows enough of one of these vessels, however, to admit of the reconstruction of the original jar. An attempt to model and incise a human face has been made on the neck of the vessel, and two conventionalized heads are added to serve as handles or lugs. The spout has the conical enlargement noted in a few other specimens. In the object illustrated, these extensions are not tipped with a nipple, as in the specimen figured by Dr Fewkes; otherwise the jar is similar. Height of specimen, 7 inches (17.8 cm.).

The writer does not attribute any phallic significance to the fact that the lateral extensions of such vessels resemble *mammæ* and that the shape of the necks may suggest a phallus, as noted by Dr Fewkes. This author does not definitely state that this similarity has a phallic meaning, merely saying that it suggests phallism. The resemblance referred to was justified at the time Dr Fewkes wrote, inasmuch as other specimens with this form of neck had not been described. As the present writer, however, was so fortunate as to find a number of fragmentary vessels with necks bearing more or less resemblance to phalli, regardless of whether the vessel was of a "*mammæ* type" or a "gourd type," he does not consider that the form of the neck has any bearing on the fact that the "*mammæ* type" of vessel has two breast-like terminations.

Practically no pottery, other than water vessels, was found in the caves of Salado. A few fragments of heavy clay griddles, such

¹ J. Walter Fewkes, "The Aborigines of Porto Rico," *25th Annual Report of the Bureau of American Ethnology*, 1907, p. 186.



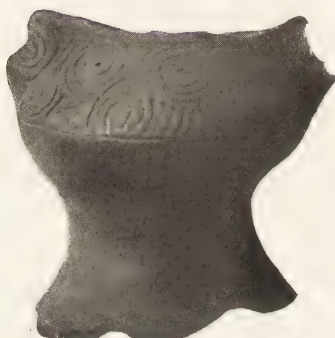
a



b



c



d



e



f

NECKS OF VARIOUS TYPES OF WATER VESSELS FROM THE SALADO CAVES



as the author has described in a paper on the archeology of Jamaica,¹ were found, and the sherds of a few cooking pots and eating bowls. One of the latter is shown in plate VII, *e*. This shallow bowl, of reddish-brown clay, is of graceful outline, with a broad, incurving rim, and resembles somewhat the boat-shaped vessels from Jamaica. The ends of the vessel extend slightly upward and each terminates in a conventionalized head. The rim is ornamented with incised lines, terminating in pits, in typical Antillean style. The lower part of the bowl is plain. Width of bowl between handles, $7\frac{1}{2}$ inches (19 cm.).

In the Salado caves were found also a number of pottery objects resembling stamps. These may be classed in two varieties: (1) those



FIG. 27.—Clay disks with incised design.

that are circular or oval and have an incised design on both sides (fig. 27, *a*, *b*), and (2) those surmounted by a raised figure on one side and with an incised pattern on the reverse (pl. IX and fig. 28). The circular specimens illustrated in figure 27 have the same incised design on each face. A number of objects of this type was found, including some oval in shape. The diameter of *a* is 3 inches (7.6 cm.), and of *b* 2 inches (5.1 cm.). It will be noted that the specimens shown in plate IX and figure 28 are surmounted by small animal figures with outspread legs, luted to the surface of the stamp. In the body of the animal, which is raised and hollow, the potter

¹ Theodoor de Booy, "Certain Kitchen-middens in Jamaica," *American Anthropologist*, N.S., vol. XV, no. 3, July-Sept., 1913, p. 434.

put certain small objects, such as seeds or stones, so that they served both as stamps and as rattles. The method of manufacture of these objects can be clearly seen in figure 28, *a*, as evidently the semi-globular clay covering of the stamp-rattle did not adhere to the body in the firing or else it afterward became detached. This specimen also enables one to observe that the potter first made the stamp, and then fashioned a shallow cup-like depression in the body of the animal surmounting it. The cup was then covered with a semi-globular disk of clay, some small seeds or stones being first placed in the cavity. The covering overlapped the edges of the lower part, and then was smoothed down until united with the stamp proper. Of the stamps illustrated, those shown in plate IX, *a*, and figure 28

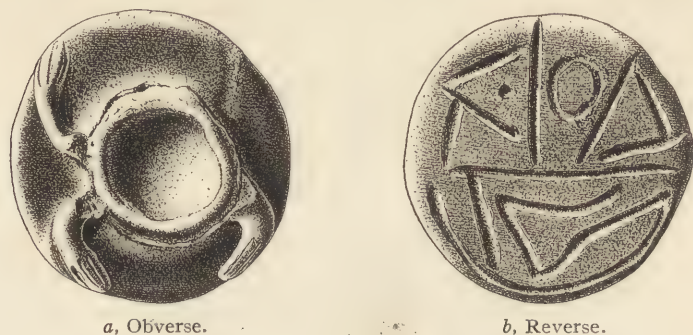
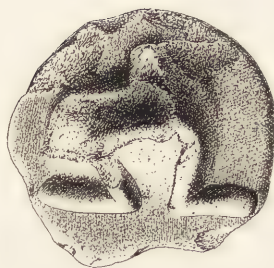


FIG. 28.—Clay stamp from the Salado caves.

are circular, and those in plate IX, *b*, *c*, *d*, rectangular. The reverse sides of the five stamps are exhibited in *a'*, *b'*, *c'*, *d'*, and figure 28, *b*. As will be seen, *a'*, *c'*, and *d'* have the same type of incised design as the flat disks shown in figure 27. Design *b'* is quite different, and to some extent resembles the swastika. Figure 28, *b*, also differs from any of the others in that it probably represents a highly conventionalized bird. Diameter of *a* (pl. IX), $2\frac{1}{8}$ inches (5.4 cm.); width of *b*, $2\frac{1}{4}$ inches (5.7 cm.); width of *c*, $2\frac{1}{4}$ inches (5.7 cm.); width of *d*, $2\frac{3}{4}$ inches (6.9 cm.); diameter of *a* (fig. 28), $2\frac{1}{8}$ inches (5.4 cm.).

One of the objects described above is figured in Dr Fewkes' report on the Aborigines of Porto Rico (plate LXXXVI, *b*, *b'*). The reverse side "suggests that it had a handle (now broken) attached to the middle," which handle probably was the body of an animal

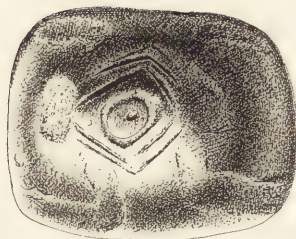




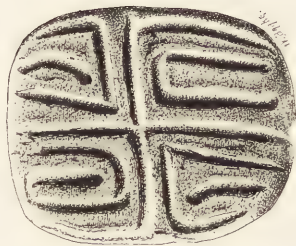
a



a'



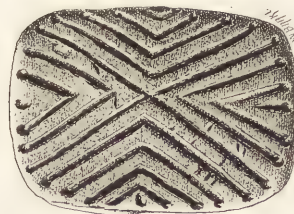
b



b'



c



c'



d



d'

CLAY STAMPS FROM THE SALADO CAVES

figure, of which the legs, shown by incised lines, can still be seen. One may also observe two incised lines, resembling antennæ, which suggest that the animal intended to be represented by the potter is an insect of the Coleoptera family.

This account does not include a description of many water vessels of the same type, but with slight variations as to design and ornamentation, from the Salado caves. Extended description of these would be out of place in this report, but will be considered in a later publication.

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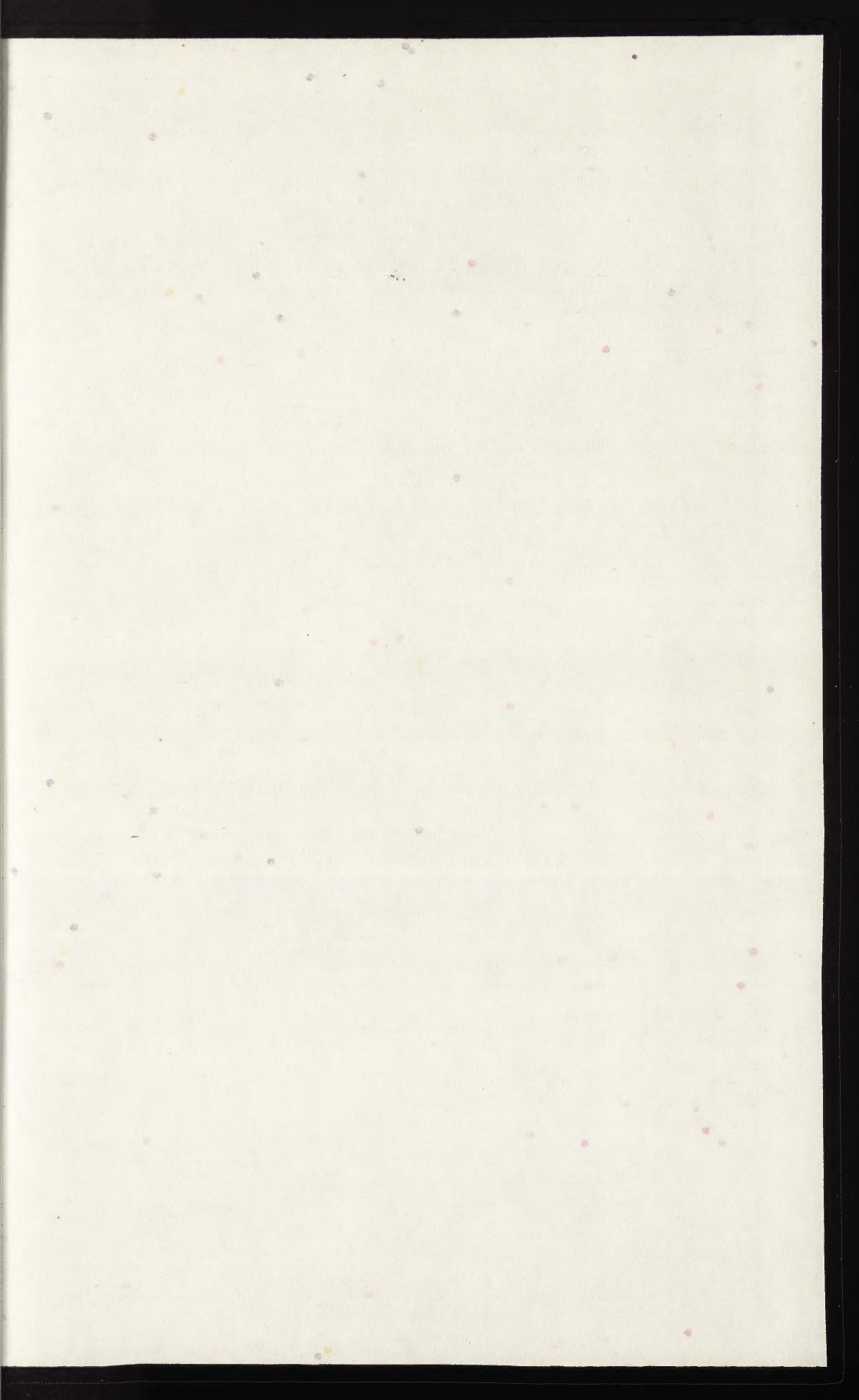














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